OhioEPA
State of Ohio Environmental Protection Agency

Southeast District Office

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Logan, OH 43138

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Bob Taft, Governor
Jennette Bradley, Lieutenant Governor
Christopher Jones, Director

December 8, 2003

US DOE-PORTS
PIKE COUNTY

DERR CORRESPONDENCE

Melda Rafferty
Project Manager
US Department of Energy
Portsmouth Site Office
P.O. Box 700
Piketon, Ohio 45661-0700

Dear Ms. Rafferty:

RE: THE X-701B SWMU DECISION DOCUMENT

Enclosed is the X-701B Decision Document which outlines the selected remedy for groundwater and soils for the X-701B SWMU which is located in Quadrant II. Ohio EPA held a public meeting on October 7, 2003, to provide the public with the opportunity to provide comment on the remedies. Ohio EPA received one comment from the public and none from US DOE. The comment is addressed in the Responsiveness Summary of the Decision Document.

Please submit to Ohio EPA a Corrective Measures Implementation (CMI) Plan within 45 days of your receipt of this Decision Document per the requirements of the Ohio Consent Decree. The CMI must include a schedule for the implementation of the groundwater and soil remedies described in the document. We anticipate working very closely with DOE during the design and implementation of the groundwater remedy.

If you have any questions, please do not hesitate to contact me at (740) 380-5289.

Sincerely,

Maria Galanti
Site Coordinator
Division of Emergency and Remedial Response

MG/jg

cc: Kristi Wiehle, US DOE
Gene Jablonowski, US EPA-Region V
Gilbert Drexel, Bechtel-Jacobs Company LLC

Ohio EPA
State of Ohio Environmental Protection Agency

COVER MEMO

Subject: The Decision Document for the X-701B SWMU at the Portsmouth Gaseous Diffusion Plant in Piketon, Ohio

Prepared by: Maria Galanti, DERR-SEDO

Necessary Approvals		Approved by	Date
(X)	Chief OFFO		12/2/03
(X)	Legal		12/03/03
( )	Supervisor		__/__/__
(X)	Manager		11/25/03
( )	District Chief		__/__/__
(X)	Site Coordinator (Maria Galanti)		11/25/03
( )	Other		__/__/__

Return All Supporting Documents to:

Name: Maria Galanti, DERR-SEDO **Telephone #:** (740) 380-5289

Figure 1

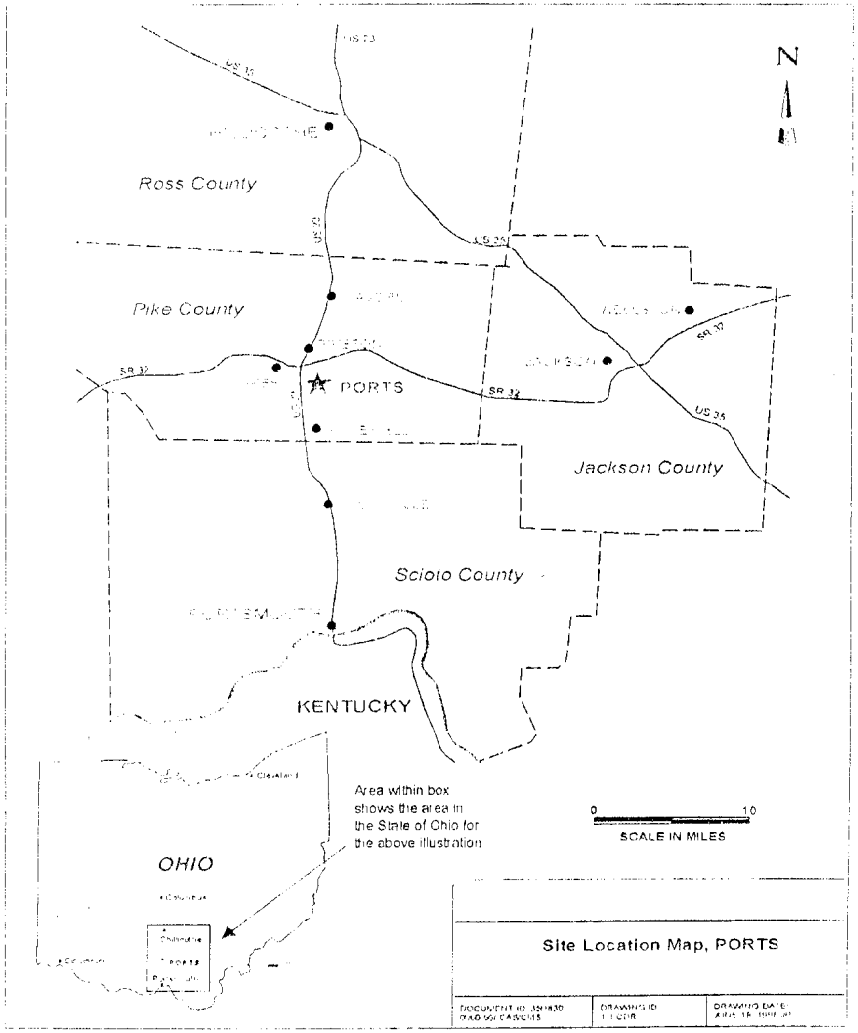

N
Ross County
Pike County
PORTS
Jackson County
Scioto County
KENTUCKY
OHIO
US 23
SR 32
US 35
SR 32
Area within box shows the area in the State of Ohio for the above illustration
0
10
SCALE IN MILES
Site Location Map, PORTS

Figure 2

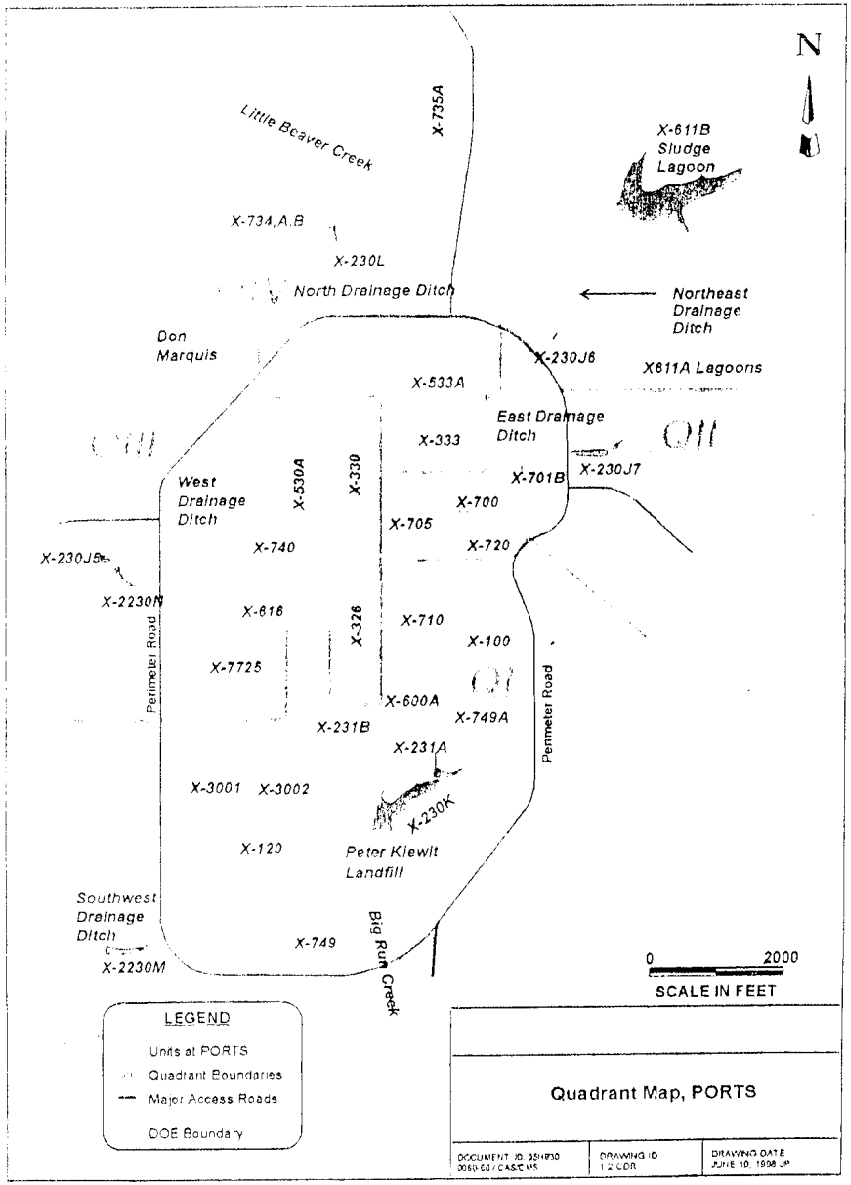

N
Little Beaver Creek
X-735A
X-611B
Sludge
Lagoon
X-734,A,B
X-230L
North Drainage Ditch
Northeast
Drainage
Ditch
Don
Marquis
X-230J6
X611A Lagoons
X-533A
East Drainage
Ditch
X-333
X-230J7
X-701B
West
Drainage
Ditch
X-530A
X-330
X-700
X-705
X-740
X-720
X-230J5
X-2230N
X-616
X-326
X-710
X-100
Perimeter Road
X-7725
X-600A
X-749A
X-231B
X-231A
Perimeter Road
X-3001
X-3002
X-230K
X-120
Peter Klewit
Landfill
Southwest
Drainage
Ditch
X-2230M
X-749
Big Run Creek
0
2000
SCALE IN FEET
LEGEND
Units at PORTS
Quadrant Boundaries
Major Access Roads
DOE Boundary
Quadrant Map, PORTS
DOCUMENT ID: 35HP30
DRAWING ID
12 COR
DRAWING DATE
JUNE 10, 1998 JP

Figure 3

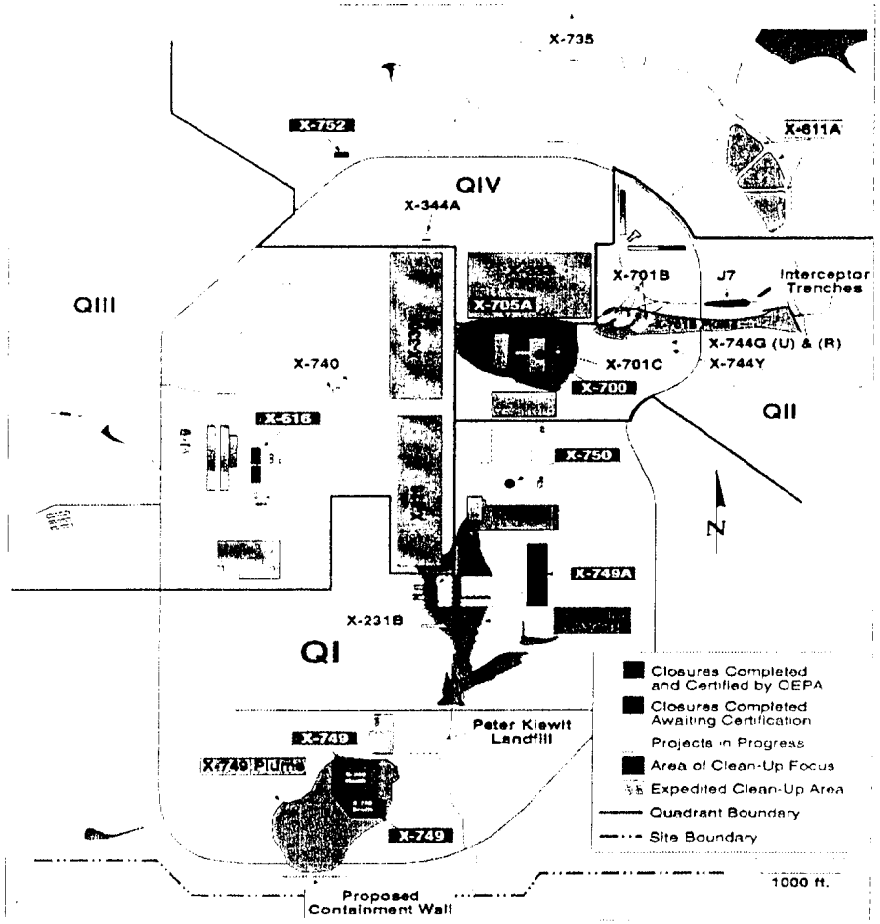
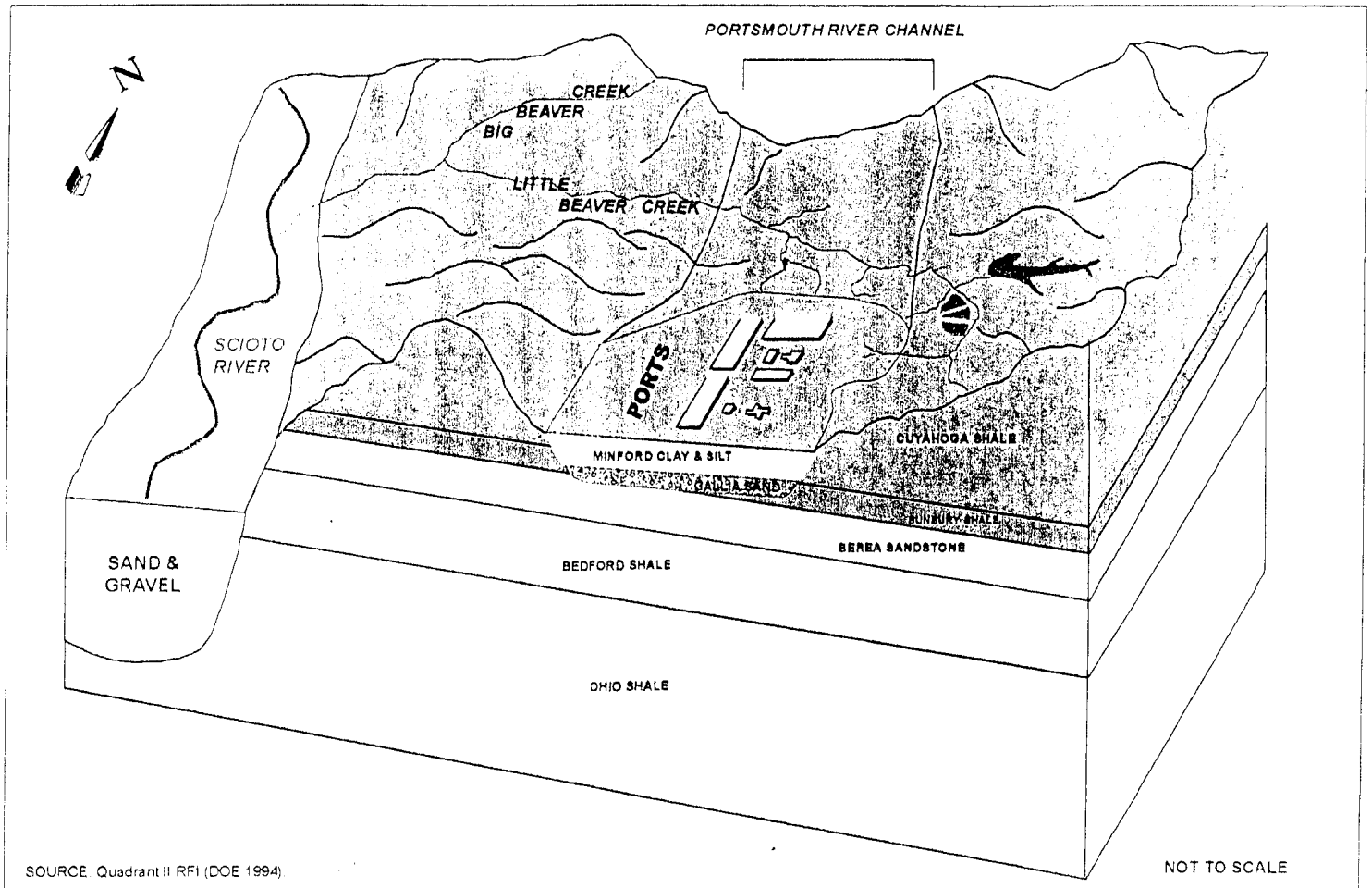

X-735
X-762
X-611A
QIV
X-344A
X-701B
J7
Interceptor Trenches
QIII
X-705A
X-744G (U) & (R)
X-744Y
X-740
X-701C
X-700
X-618
QII
X-750
N
X-749A
X-231B
QI
Closures Completed and Certified by CEPA
Closures Completed Awaiting Certification
Projects in Progress
Area of Clean-Up Focus
Expedited Clean-Up Area
Quadrant Boundary
Site Boundary
Peter Kiewit Landfill
X-749
X-749 Plume
X-749
1000 ft.
Proposed Containment Wall

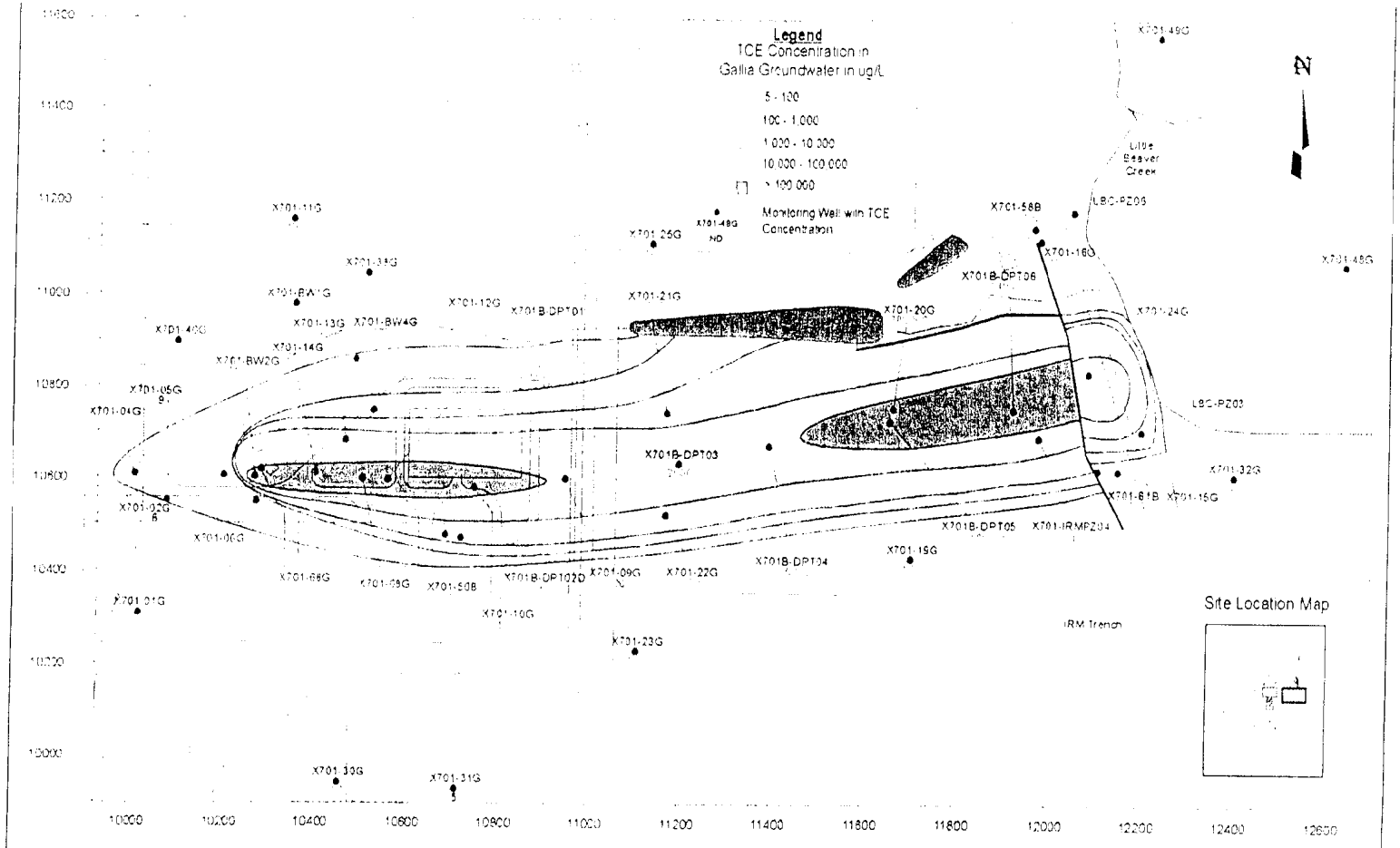
Figure 4



Portsmouth Gaseous Diffusion Plant

Figure 5

Figure 6



	X-701B Groundwater Investigative Area Plume - 1998 Map	DOCUMENT ID 35U650 0060-70/CASCMS	DRAWING ID 2_8b CDR	DRAWING DATE July 28, 2000 JR

Figure 7

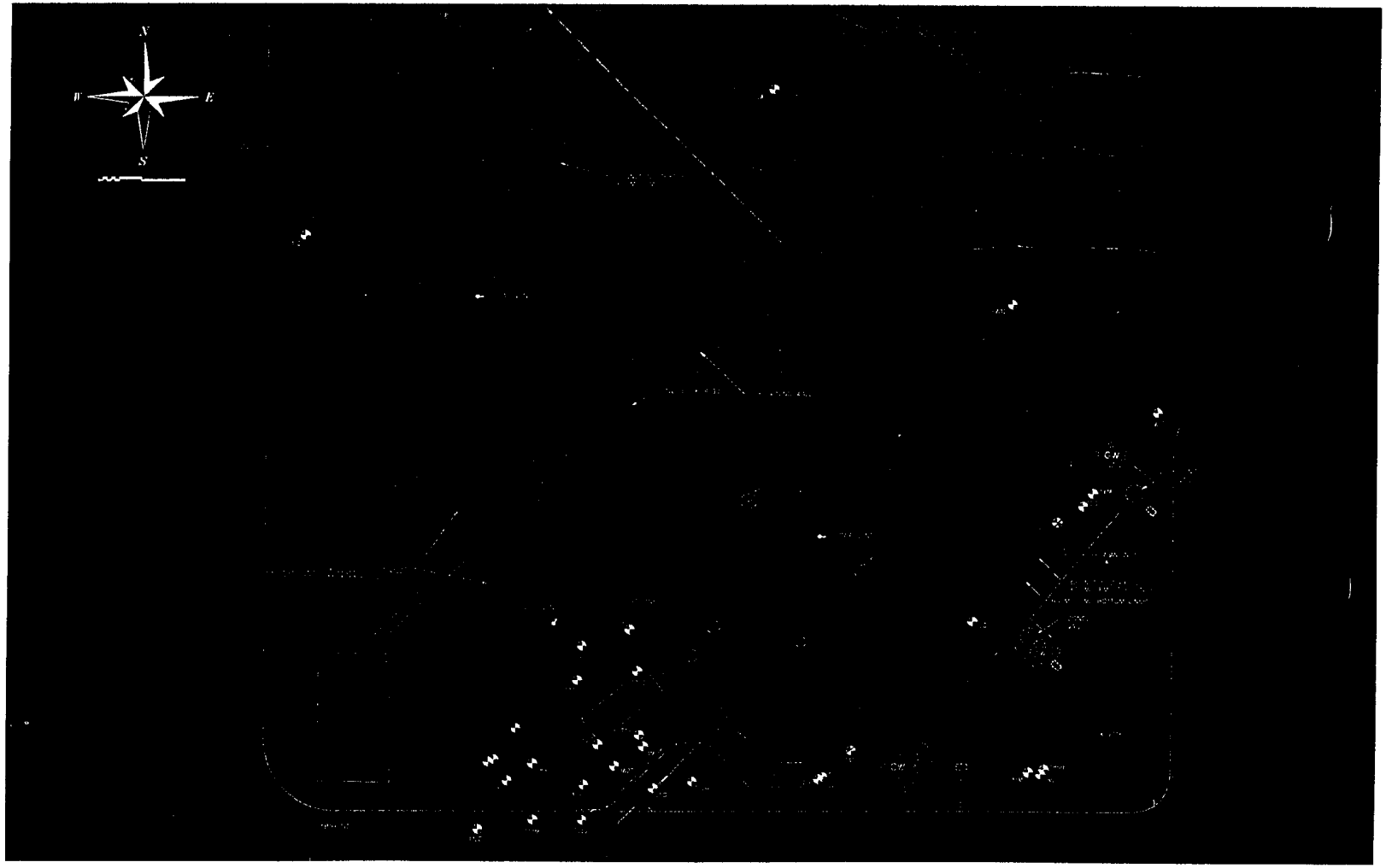
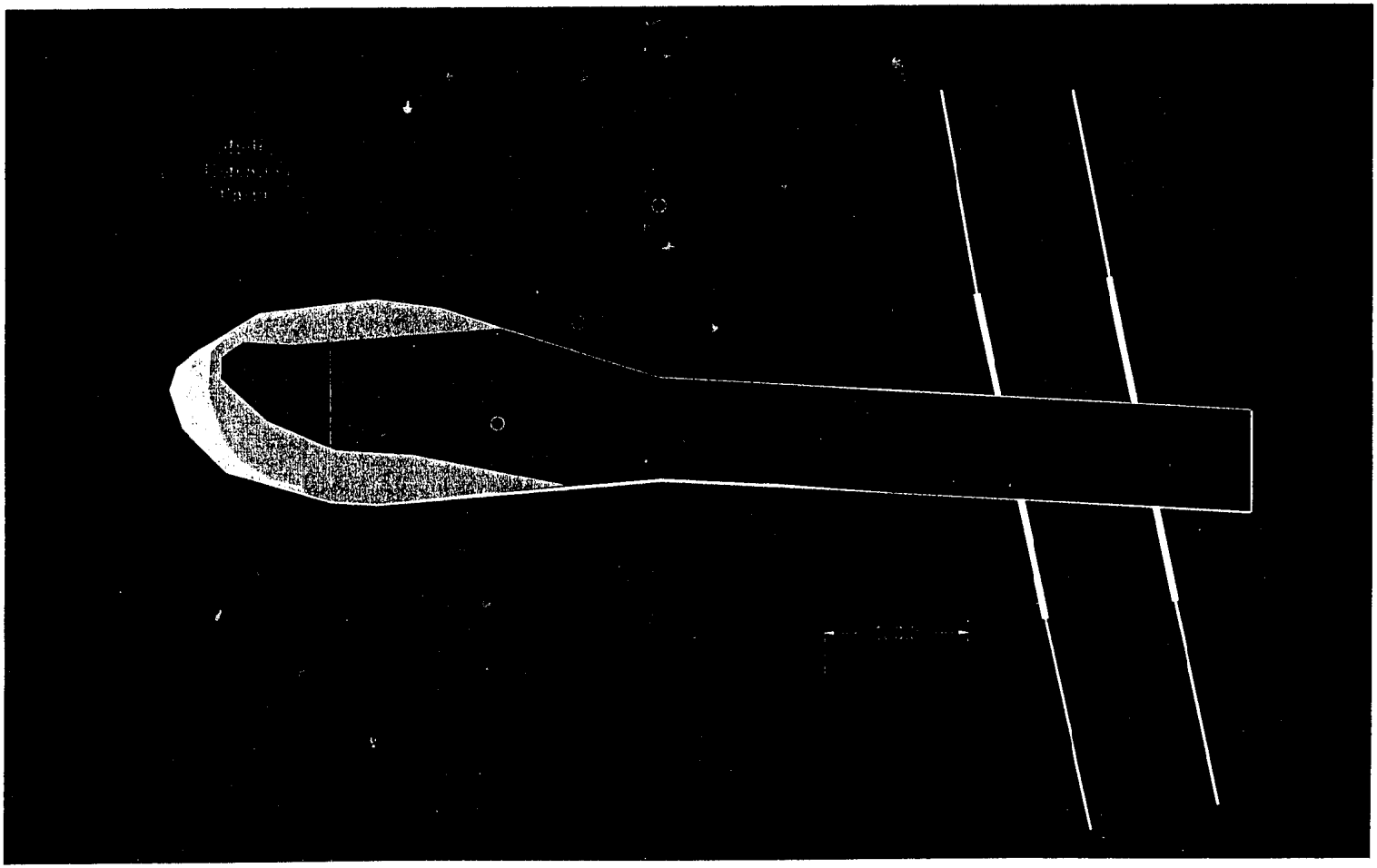


Figure 8



OHIO EPA's DECISION DOCUMENT FOR THE X-701B SWMU IN QUADRANT II OF THE US DOE PORTSMOUTH FACILITY PIKETON, OHIO

DECEMBER 2003

TABLES

APPENDICES

FIGURES

ARARs

LIST OF ACRONYMS AND ABBREVIATIONS

ALARA	As low as reasonably achievable
ARAR	Applicable or relevant and appropriate requirement
BAT	Best available technology
bgs	Below ground surface
BRA	Baseline risk assessment
BTEX	Benzene, toluene, ethylbenzene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund Law)
CAS/CMS	Corrective action study and corrective measures study
CDI	Chronic daily intake
CFR	Code of Federal Regulations
COC	Chemical of concern
COPC	Chemical of potential concern
D&D	Decontamination and Decommissioning
ft^2	Square foot
GCEP	Gas Centrifuge Enrichment Plant
gpd	Gallon per day
HDPE	High-density polyethylene
HI	Hazard index
HQ	Hazard quotient
IGWMP	Integrated groundwater monitoring plan
MCL	Maximum contaminant level
mg/kg	Milligram per kilogram
mg/kg/day	Milligram per kilogram per day
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollution Discharge Elimination System
OAC	Ohio Administrative Code
O&M	Operation and maintenance
Ohio EPA	Ohio Environmental Protection Agency
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCE	Perchloroethene
pCi/kg	Picocurie per kilogram
PORTS	Portsmouth Gaseous Diffusion Plant
ppm	Part per million
PRG	Preliminary remediation goal
RCRA	Resource Conservation and Recovery Act
RfD	Reference dose
RFI	RCRA facility investigation
SVOC	Semivolatile organic compound
SWMU	Solid waste management unit
TCE	Trichloroethene
TPH	Total petroleum hydrocarbons

TSCA	Toxic Substances Control Act
U.S. DOE	U.S. Department of Energy
USEC	U.S. Enrichment Corporation
U.S. EPA	U.S. Environmental Protection Agency
UST	Underground storage tank
VER	Vacuum extraction recovery
VOC	Volatile organic compound
µg/kg	Microgram per kilogram
µg/L	Microgram per liter

PART 1: DECLARATION STATEMENT

DECLARATION STATEMENT

SITE NAME AND LOCATION

U.S. Department of Energy
Portsmouth Gaseous Diffusion Plant (PORTS)
X-701B SWMU in Quadrant II
Piketon, Ohio

STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial actions for the Portsmouth Gaseous Diffusion Plant (PORTS), X-701B Solid Waste Management Unit (SWMU) located in Quadrant II, on the United States Department of Energy (U.S. DOE) Reservation in Piketon, Ohio. These actions were chosen in accordance with the Resource Conservation and Recovery Act (RCRA) of 1976; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986; and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the Hazardous and Solid Waste Amendments of 1984. The remedial actions are based on the administrative record for this response action. The remaining units in Quadrant II will be addressed separately in future Preferred Plan(s) and Decision Document(s).

The PORTS X-701B SWMU is being cleaned up under (1) a Consent Decree between U.S. DOE and the State of Ohio (1989), (2) a 1997 Administrative Consent Order in which Ohio EPA maintains the oversight of the day to day activities while U.S. EPA maintains its authority under CERCLA and RCRA and (3) a 1999 Administrative Integration Order on Consent between Ohio EPA and U.S. DOE pertaining to certain SWMUs on the Reservation. Documentation for the selection of these remedial actions are available in the administrative record for the quadrant, which is maintained at both the U.S. DOE Environmental Information Center in Piketon, Ohio,

iiand at the Ohio EPA Southeast District Office in Logan, Ohio. The specific documents include, but are not limited to, the Quadrant II final RCRA facility investigation (RFI) report dated 1996, the Baseline Ecological Risk Assessment, the Air RFI report, the Background Sampling Investigation Report for Soil and Groundwater, the Ohio EPA X-701B Preferred Plan, the Polycyclic Aromatic Hydrocarbon (PAH) Position Paper, the Polychlorinated Biphenyl (PCB) Position Paper, the Quadrant II CAS/CMS Report and other documents including but not limited to the Annual Groundwater Report.

SITE ASSESSMENT

Actual or threatened releases of hazardous substances from the X-701B SWMU, if not addressed by implementing the response actions proposed in this Decision Document, may pose current or future risks to public health and welfare and the environment.

DESCRIPTION OF THE SELECTED REMEDIES

Ohio EPA's selected alternative for the soils at the X-701B Holding Pond and Retention Basins is a modified version of Alternative 3. Alternative 3 consists of Institutional Controls, selective removal of soil, and containment (capping). Institutional controls include the use of deed and land use restrictions. The cap shall be engineered to meet the RCRA Subtitle C substantive requirements. U.S. DOE will consolidate contaminated soil under two caps. Ohio EPA has determined that re-consolidation of soils is preferable in this instance rather than removal. One cap will cover the X-701B Holding Pond and the Eastern Retention Basin. The second cap will cover the Western Retention Basin. Contaminated soils in this area beyond the foot print of the caps would be consolidated to fit under one or both caps.

Alternative 3 as modified by Ohio EPA will provide the best balance of trade-offs considering the criteria used to evaluate the alternatives presented in the CAS/CMS report. This alternative will be protective of human health and the environment in the short and long terms and is considered permanent as long as the integrity of the cap is maintained. U.S. DOE will periodically inspect the cap to ensure that it is performing as required. This alternative also will meet State, Federal and Local Laws and Regulations, be cost-effective, and provide long-term effectiveness. Specifics regarding the implementation of the remedy will be completed during the Corrective Measures Implementation Plan (CMI) and the design of the cap. Total cost of this proposed alternative as modified is $3,000,000.

Ohio EPA's selected alternative for the X-701B Groundwater Area is a modification of Alternative 8. Alternative 8 was submitted as an addendum to the CAS/CMS report in January 2003. Alternative 8 consists of oxidant injection, and groundwater recirculation in the western portion of the plume in the source area. The primary goal for injecting in this area is to eliminate the source of TCE. Oxidant would be injected in those areas to accomplish this task. Current pumping wells will be incorportated into the designs as needed.

U.S. DOE will also use the eastern horizontal well to inject oxidant into the plume. The purpose of injecting in this horizontal well is to remediate the portion of the plume which extends eastward from this well (near the security fence) to the interceptor trench. The interceptor trench would be operated and maintained until Preliminary Remedial Goals (PRGs) are met throughout the plume. The total cost of this remedy as selected is 43,952,000.

STATUTORY DETERMINATIONS AND REMEDY SELECTION STANDARDS

The selected remedies meet the CERCLA statutory determination because they are protective of human health and the environment, comply with federal and State of Ohio requirements that are legally applicable or relevant and appropriate to the remedial actions, and are cost effective. The selected remedies use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The remedy selected for the groundwater contamination at X-701B satisfies the statutory preference in CERCLA and SARA for treatment as a principal element. However the remedy selected for the soil contamination does not.

The selected remedies comply with RCRA remedial selection standards because they protect human health and the environment; control the source of releases so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment; and comply with applicable standards for management of wastes.

PART 2: DECISION SUMMARY

1.0 INTRODUCTION

The Ohio Environmental Protection Agency (Ohio EPA) has selected remedial alternatives to address the soil and groundwater contamination at the X-701B SWMU of the Portsmouth Gaseous Diffusion Plant (PORTS) on the U.S. Department of Energy (U.S. DOE) Reservation in Piketon, Ohio. This decision document discusses the preferred alternatives and summarizes the unit and site background and findings presented in the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) reports, and the corrective action study and corrective measures study (CAS/CMS). The RFI and CAS/CMS reports and associated addendums present a full description of quadrant investigations and the alternatives evaluated.

This decision document consists of seven sections besides this introduction. These sections are listed below.

- Section 2.0 Opportunities for Public Involvement
- Section 3.0 Site and Quadrant Background
- Section 4.0 Risk Assessment Summary
- Section 5.0 Solid Waste Management Unit (SWMU) Descriptions and Development of Alternatives
- Section 6.0 Summary of Comparative Analysis of Alternatives
- Section 7.0 Ohio EPA's Preferred Alternatives for Quadrant II
- Section 8.0 US EPA Concurrence with Ohio EPA's Preferred Remedy

Appendix I shall provide the Applicable or Relevant and Appropriate Requirements (ARARs) for X-701B.

2.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Ohio EPA relies on the public to ensure that the remedial alternative selected for a site meets the needs of the local community in addition to being an effective solution to the environmental problem. Ohio EPA formally presented the Preferred Plan for the X-701B SWMU soil and groundwater contamination at a public availability session and hearing held on October 7, 2003, at the Ohio State South Center in Piketon, Ohio. Ohio EPA discussed the RFI, CAS/CMS, and

Preferred Plan. In addition, Ohio EPA answered questions and received comments relevant to the preferred remedy. Ohio EPA provided public notice about the availability of the Preferred Plan and other documents related to the X-701B SWMU in order to give the public an opportunity for reviewing the Preferred Plan. Comments were solicited on all alternatives summarized in the Preferred Plan and evaluated in the CAS/CMS report. Responses to significant comments, criticisms, or new data received during the comment period and public meeting are included in the "Responsiveness Summary" which is attached to this document at Appendix IV. Public notice is necessary under the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), Title 40 of the Code of Federal Regulations (CFR), Part 300; Ohio Administrative Code (OAC) Section 3745-47-12; and RCRA Regulations 124.10 and 124.24.

This decision document presents the selected remedial actions for the X-701B SWMU groundwater and soil contamination at the US DOE Portsmouth facility. These actions were chosen in accordance with RCRA, CERCLA, and SARA, and to the extent practicable, the NCP, the HWSA of 1984, and the applicable and appropriate State regulations. The decisions made in this document are based on the administrative record for this response action.

All documents regarding the X-701B SWMU are available at the following locations:

U. S. Department of Energy
Environmental Information Center
3930 U.S. Route 23
P. O. Box 693
Piketon, Ohio 45661
Telephone No: (740) 289-3317

and

Ohio Environmental Protection Agency
Southeast District Office
2195 Front Street
Logan, Ohio 43138
Telephone No: (740) 385-8501
E-mail: maria.galanti@epa.state.oh.us

The selected alternatives outlined in this document are Ohio EPA's choices for addressing the X-701B soil and groundwater contamination problems.

Technical information about the site and administrative record documents can be obtained from the following individuals:

Maria Galanti
Project Coordinator
Ohio Environmental Protection Agency
Southeast District Office
2195 Front Street
Logan, Ohio 43138
Telephone No: (740) 385-8501
E-mail: maria.galanti@epa.state.oh.us

or

Gene Jablonowski
Project Manager
U.S. Environmental Protection Agency (SR-6J)
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Chicago, Illinois 60604-3590
Telephone No: (312) 886-4591
E-mail: jablonowski.eugene@epamail.epa.gov

3.0 SITE AND QUADRANT BACKGROUND

PORTS is located near Piketon, Ohio, in the south-central portion of the state (see Figure 1). The PORTS enrichment facility encompasses approximately 1,000 of the 3,714-acre U.S. DOE Reservation. The principal process at PORTS is the separation of uranium isotopes through gaseous diffusion. PORTS began operations in 1954, enriching uranium for use in commercial reactors and U.S. Navy power reactors. Production of enriched uranium for U.S. Navy use ceased in 1991. PORTS and all its production facilities are owned by U.S. DOE and have been leased by the U.S. Enrichment Corporation (USEC) since 1993. The enrichment operation became private in July 1998. USEC ceased all enrichment operations in May 2001 and the facility was placed in cold stand by status by U.S. DOE. Other portions of PORTS are leased to

the Ohio Army National Guard and the Southern Ohio Diversification Initiative (SODI). U.S. DOE remains the property owner.

Support operations for the production of enriched uranium included the feed and withdrawal of material from the primary process, decontamination of equipment removed from the primary process, water treatment for sanitary and cooling purposes, decontamination of equipment removed from the plant for maintenance or replacement, recovery of uranium from various waste materials, and treatment of sewage wastes and cooling water blowdown. The construction, operation, and maintenance of PORTS required the use of a wide range of commercially available chemicals. Continuous operation of PORTS since 1954 has resulted in the generation of inorganic, organic, and low-level radioactive wastes.

For purposes of the RFI, PORTS was divided into quadrants (see Figure 2). Each quadrant roughly corresponds to a distinct groundwater flow cell within the primary water-bearing unit beneath PORTS and has been investigated separately. The X-701B SWMU which is located in Quadrant II is located in the western portion of the quadrant just north of the X-744G Facility (see Figure 3). The Quadrant II RFI was conducted in two phases. Phase I of the investigation was conducted from February to August 1990. Phase II was conducted from October to December 1993. All media except air were investigated during the RFI. The final version of the RFI report was submitted on September 30, 1996. The Quadrant II RFI report received final approval from Ohio EPA on September 5, 1997. U.S. DOE submitted a closure plan to the Ohio EPA Division of Hazardous Waste Management for the X-701B SWMU on November 8, 1994, which was approved by Ohio EPA on March 21, 1995. The closure plan was withdrawn in accordance with the requirement of the 1999 Integration Administrative Order on Consent. The Quadrant II CAS/CMS report which discusses the X-701B SWMU was first submitted in August 2000. The CAS/CMS Report was approved by Ohio EPA on March 26, 2001. Several addendums to the CAS/CMS report regarding the alternatives for the soils and groundwater contamination at the X-701B SWMU were prepared by U.S. DOE and submitted to Ohio EPA in February 2001, June 2002, December 2002, January 2003, and March 2003.

The X-701B SWMU characteristics as well as the geology and hydrogeology at PORTS are discussed below.

3.1 DESCRIPTION OF THE X-701B SWMU CHARACTERISTICS

The X-701B Holding Pond and Retention Basins were not investigated as part of the RFI because they were undergoing RCRA closure. However, this unit is now being addressed in the CAS/CMS report via the requirements of the 1999 Integration Administrative Order on Consent as well as the 1989 Ohio consent Decree. The groundwater contaminant plume from X-701B SWMU is being addressed as part of the CAS/CMS process. The 1999 Integration Administrative Order on Consent between Ohio EPA and U.S. DOE provided certain administrative exemptions to closure requirements in order to unify all PORTS remedial requirements in a timely and efficient manner.

3.2 GEOLOGY AND HYDROGEOLOGY

The geology (or site soil and bedrock) at PORTS has been characterized through the drilling of over 1,200 borings throughout the facility. The uppermost geologic layer (called the "unconsolidated material") consists of Minford Formation silt and clay and Gallia Formation sand and gravel. Where undisturbed, the Minford Formation consists of an upper clay layer that grades into a silt layer. Generally, the upper clay layer comprises two-thirds of the Minford Formation and consists of strong stiff clay. The silt portion of the Minford Formation is more permeable but still contains a relatively high percentage of finer clay material. The Gallia Formation is composed of poorly sorted sand and gravel with silt and clay. Below the Gallia Formation sand and gravel is the Sunbury Shale and then the Berea Sandstone. The Sunbury Shale generally thins from east to west across PORTS and is generally absent on PORTS's western side (see Figure 4). A more detailed description of the PORTS geology is provided in Section 2.0 of the Quadrant II RFI report and Section 1.3.3.3 of the Quadrant II CAS/CMS Report.

The groundwater flow system at PORTS includes two aquifers: the bedrock Berea Sandstone and the unconsolidated Gallia Formation. PORTS also has two aquitards: the Sunbury Shale and the unconsolidated Minford Formation. The basal silt portion of the Minford Formation is generally grouped with the Gallia Formation as the uppermost primary aquifer at PORTS. The hydraulic properties of these units were well defined during the RFI. Groundwater flow maps for the Gallia Formation and Berea Sandstone are provided in Appendix A of the Quadrant II RFI report.

4.0 RISK ASSESSMENT SUMMARY

The assessment of potential or current risks from wastes present at the X-701B SWMU in Quadrant II is based on guidance provided by the U.S. Environmental Protection Agency (U.S. EPA), in particular, the "Risk Assessment Guidance for Superfund" (RAGS) dated 1989 and "Guidelines for Exposure Assessment" dated 1992. These guidance documents are founded on well-established chemical risk assessment principles developed for the regulation of environmental contaminants.

The risk assessment for contaminated areas at Quadrant II consisted of a human health risk assessment and an ecological risk assessment. The ecological risk assessment was conducted separately. The initial risk assessment conducted for Quadrant II assumed that no future cleanup action would be taken and is referred to as the "baseline risk assessment" (BRA). The X-701B SWMU risks are discussed in the CAS/CMS Report. A description of the risk associated with X-701B was excluded from the approved RFI for Quadrant II since it was undergoing a RCRA closure. The methodology used to conduct each step of the risk assessment, starting from the BRA, is discussed below.

4.1 BASELINE RISK ASSESSMENT

The BRA consisted of identifying chemicals of potential concern (COPC), exposure assessment, estimation of environmental concentrations, and estimation of human intake. Each of these activities is discussed below.

4.1.1 Identification of Chemicals of Potential Concern

After data collected during the RFI were evaluated, chemicals detected during laboratory analysis were retained as COPCs. Data not appropriate for certain exposure pathways were excluded. For example, soil data for samples collected from greater than 10 feet below ground surface (bgs) are not expected to apply to the threat of possible ingestion of contaminated soil by children or adults but are expected to pose a threat to groundwater.

4.1.2 Exposure Assessment

This activity involves the evaluation of potential human exposure to site chemicals through two basic tasks: characterization of the exposure setting and identification of human exposure pathways.

4.1.2.1 Characterization of the Exposure Setting

The exposure setting was characterized by modeling or simulating exposure scenarios considered possible at Quadrant II under both current and future land-use scenarios.

Current Use Scenarios

- On-site worker
- Off-site resident
- Off-site recreational population
- On-site resident*

* This scenario was no longer considered viable after the completion of the RFI report. Stakeholders and regulators determined it is likely that the area within the security fence will remain industrial and that other areas within the reservation will be used for commercial or recreational purposes. Areas at the reservation boundary will still be evaluated as residential.

The on-site worker scenario describes potential exposures to outdoor media at PORTS of a worker engaged in normal day-to-day activities throughout Quadrant II. The future worker scenario describes potential exposures to outdoor media at PORTS and includes the ingestion of groundwater. The recreational population scenario assesses potential exposure to surface water bodies on the PORTS reservation and to fish and game eaten by local recreational anglers and hunters. To estimate exposure for both current off-site resident and recreational populations, significant direct access to media within the boundaries of the unit were considered unlikely. Exposures were assumed to result from contaminants that could potentially migrate off site.

Future Use Scenarios

- On-site commercial use (evaluated after approval of the RFI and BRA)
- On-site recreational population
- On-site industrial worker
- Off-site resident
- Off-site recreational population

Future use scenarios were developed consistent with reasonable maximum exposure. The area within the security fence at the Portsmouth Facility is expected to remain industrial in the future. Areas outside the security fence within the reservation were evaluated under a future recreational and commercial use scenario.

In addition to the on-site worker involved in normal day-to-day activities, another exposure scenario modeled under both current and future use conditions involves the on-site industrial worker. This worker is assumed to be in contact with contaminated media during periodic intrusive activities such as construction or landscaping. The future industrial worker scenario describes potential exposures to outdoor media at PORTS and includes ingestion of groundwater.

4.1.2.2 Identification of Human Exposure Pathways

The exposure scenarios discussed above were developed to model or simulate possible exposure situations at the site including Quadrant II and areas associated with the X-701B SWMU. It was necessary to determine the most likely exposure pathways as well. An example of an exposure pathway is the ingestion of contaminated groundwater by future on-site industrial workers. The following exposure pathways were evaluated for both the current and future on-site industrial worker as well as for the off-site recreational population:

- Exposure to groundwater through ingestion of drinking water and dermal contact and inhalation of volatiles during showering (for future on-site industrial worker only)

- Exposure to soil through incidental ingestion and dermal contact and through external gamma radiation from radionuclides present in soil
- Exposure to sediment through incidental ingestion and dermal contact
- Exposure to surface water through incidental ingestion and dermal contact
- Exposure to air through inhalation of vapors and particulates
- Exposure through ingestion of local game contaminated by grazing on land affected by site operations
- Exposure through ingestion of fish affected by site operations

4.1.3 Estimation of Environmental Concentrations

Concentrations of chemicals and radionuclides in various environmental media from which exposure may occur were estimated through the evaluation of sampling results and mathematical modeling. The Quadrant II RFI as well as the other relevant reports provides detailed discussion of this estimation.

4.1.4 Estimation of Human Intake

Estimation of human intake involves calculating the amount of each chemical and radionuclide an individual is exposed to through the various environmental media. Chemical intakes (referred to as chronic daily intakes [CDI]) are typically expressed in terms of the amount of material in contact with the body for a certain time period and are calculated as functions of (1) chemical concentration in soil or water, (2) how often the exposure occurs and for how long (exposure frequency), (3) body weight, and (4) the portion of a lifetime that exposure occurs. The generic equation for calculating a CDI (along with example units of measure) is as follows:

$$CDI = \frac{Cx\ CR\ x\ EF\ x\ ED}{BW\ x\ AT}$$

where

CDI	=	Chronic daily intake (milligram per kilogram per day [mg/kg/day])
C	=	Chemical concentration in soil or water (mg/kg)
CR	=	Contact rate (kg/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (portion of lifetime over which exposure is averaged; days)

Variations of this equation are used to calculate air inhalation and radiological exposures.

4.2 TOXICOLOGICAL ASSESSMENT

The toxicological assessment involves identifying adverse health effects associated with exposure to a chemical or radionuclide and the relationship between the extent of exposure and the likelihood and severity of adverse effects. U.S. EPA has conducted such assessments of many frequently occurring environmental chemicals and radionuclides and has developed toxicity values based on these assessments for use in risk assessments. Further information regarding the toxicological assessment is presented in the Quadrant II RFI and associated report.

4.3 DETERMINATION OF CLEANUP OBJECTIVES

Cleanup goals for remediation at Quadrant II were determined through the evaluation of the following factors:

- Risk characterization
- Preliminary remediation goals (PRG)
- Use of as low as reasonably achievable (ALARA) and best available technology (BAT) principles
- Groundwater conditions

- Summary of polycyclic aromatic hydrocarbon (PAH) position paper
- Summary of polychlorinated biphenyl (PCB) position paper

Each of these factors is discussed below.

4.3.1 Risk Characterization

Risk characterization involves calculating estimates of carcinogenic (cancer causing) and non-carcinogenic risks from chemicals of concern for different exposure pathways. CERCLA requires keeping cumulative residual excess cancer risks (ECR) within the one in 1×10^{-4} to 1×10^{-6} range for all chemical carcinogenic contaminants (with 1×10^{-6} as the "point of departure") and hazard indexes (HI) of 1 or less for noncarcinogenic contaminants. Cancer risk is defined as the probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen in addition to the probability of cancer risks from all other causes. As a benchmark in developing cleanup goals at contaminated sites, an acceptable range of ECR has been established of one in one million (1×10^{-6}) to one in ten thousand (1×10^{-4}). The point of departure or program goal for risk remaining after a site is cleaned up is 1×10^{-6} (that is, a one in one million excess lifetime cancer risk above and beyond risks from other unrelated causes).

The hazard quotient (HQ) is used to determine the severity of noncarcinogenic hazards posed by a site. The HQ is determined by dividing the CDI by the reference dose (RfD). The reference dose is the amount of a chemical determined to cause a toxic effect. If the HQ is less than or equal to 1, the estimated exposure to a substance represented by the CDI is judged to be below the threshold that could result in a toxic effect. An HQ greater than 1 indicates that a toxic effect may result. To assess the cumulative effect of similar noncarcinogenic substances, the HQs for all substances being assessed at a site are added, and this result is the HI.

4.3.2 Preliminary Remediation Goals

The risks for substances at the X-701B SWMU in Quadrant II were compared to target risk levels (PRGs), and general conclusions were made regarding potential risks associated with these substances. In general, if the risks were unacceptable, remedial alternatives were developed to reduce potential exposure of human and ecological receptors to acceptable levels. This unit was undergoing closure under the requirements of RCRA. A risk assessment was not completed and

therefore is not presented in this document. Based on the levels of contamination in soils and groundwater it was determined that the ELCR of 10^{-6} and an HI of 1 have been exceeded.

U.S. DOE will adhere to RCRA and CERCLA guidance and has also agreed that the initial goal for each alternative in the CAS/CMS report is to achieve PRGs when practicable. ALARA and BAT principles will also be considered during remediation.

4.3.3 Groundwater Conditions

Groundwater and surface water monitoring at PORTS began in the 1980s. Since that time, numerous investigative studies and routine monitoring programs have provided much geologic and hydrogeologic information. Groundwater monitoring has been conducted in response to regulatory requirements of the OAC, closure documents, the Consent Decree between U.S. DOE and Ohio EPA, and U.S. DOE orders.

The Integrated Groundwater Monitoring Plan (IGWMP) is designed to minimize the potential for conflicts in requirements and to maximize resources for collecting data needed for sound decision-making. Keeping the intent of the regulatory directives and objectives of various monitoring programs in mind, the IGWMP is designed to establish all groundwater monitoring requirements for PORTS. The requirements established for continued groundwater monitoring for the selected remedial alternatives at the X-701B SWMU will be incorporated into the IGWMP and will be revised as determined necessary by Ohio EPA.

4.3.4 Summary of the PAH Position Paper

PAHs, a common contaminant at PORTS, are introduced into the environment by both natural and anthropogenic combustion processes. PAHs are semivolatile organic compounds (SVOC) that consist of two or more fused aromatic rings and include chemicals such as anthracene, benzo(a)pyrene, fluoranthene, and naphthalene. PAHs are formed when hydrocarbons undergo incomplete combustion, such as when hydrogen is consumed in preference to carbon.

The purpose of the PAH position paper was to evaluate and demonstrate that the PAH contamination at PORTS was similar in concentration to areas outside of PORTS and therefore not related to site processes but rather resulting from the infrastructure of the Reservation (such as asphalt roofs, roadways, and automobile exhaust). The PAH position paper was approved by Ohio EPA on May 8, 1997. Risk goals were developed based on the most current PAH

information available. The concentrations of PAH contamination were evaluated in unregulated areas (such as along roadways and community parks) as well as residential areas.

The report concluded that many of the elevated detections of PAHs appeared to result from sources such as tar-covered gravel lots, asphalt roads and parking lots, vehicle exhaust and possibly air emissions, and runoff from the coal-fired steam plant. The paper also concluded that areas containing PAHs at concentrations similar to PAH concentrations in nonregulated or residential areas should not be remediated at this time. Such an effort would not be cost-effective because these areas would likely become recontaminated. Areas such as drainage ditches, streams, and creeks will be deferred to D&D. The risk from PAHs will be evaluated at that time, and the proper remedial action will be taken.

4.3.5 Summary of the PCB Position Paper

The purpose of the PCB position paper, which was approved on September 11, 1997, was to evaluate the levels and extent of PCB contamination at Quadrant II and develop a risk goal protective of human health and the environment. At PORTS, PCBs have been used as cooling fluids in electrical transformers and capacitors; for heat transfer and hydraulic fluids; as dye carriers in carbonless copy paper; in paints, adhesives, and caulking compounds; and as sealants and road coverings to control dust. RFI and baseline ecological risk assessment sampling activities indicated that at least one PCB compound was detected at 98 of the 1,007 locations where soil was sampled at Quadrant I. PCB detections in soil appear to be distributed widely across PORTS. Of the 148 sediment samples analyzed for PCBs during the RFI and the baseline ecological risk assessment, 28 contained at least one PCB compound.

The PCB remedial goal for PORTS was based on the most probable future land use, which has been determined as industrial for Quadrant II within the perimeter road. In order to be consistent with risk goals, the cleanup goal for Quadrant II within the perimeter road is 25 parts per million (ppm). The 25-ppm goal for Quadrant II and the X-701B SWMU is consistent for an industrial site as cited in the Toxic Substances Control Act (TSCA) and CERCLA guidance as well as in the Federal Register, Proposed Rule, December 1996. Soil at the Peter Kiewit Landfill at Quadrant I is the only location where PCB concentrations exceed 25 ppm. This soil has been addressed as part of the remedial activity at the landfill.

5.0 X-701B SWMU DESCRIPTION

The X-701B SWMU is described in detail in the CAS/CMS report for Quadrant II and other associated documents including but not limited to the Description of Current Conditions for Quadrant II issued by U.S. DOE on December 7, 1990.

5.1 X-710B SWMU - DEVELOPMENT OF REMEDIAL ALTERNATIVES

The X-701B Holding Pond, Retention Basins and the X-701B Area Groundwater Plume are described in the chapters below. Based on the information provided in varying supporting documents, U.S. DOE was able to provide a wide array of alternatives for soil and groundwater for Ohio EPA to review.

5.2 X-701B HOLDING POND AND RETENTION BASINS - DETAILED DESCRIPTION

The X-701B Holding Pond was an unlined, 200 ft by 50 ft pond used for the neutralization and settling of metal-bearing wastewater, solvent-contaminated solutions and acidic wastewater. The X-701B Holding Pond was in use from 1954 until November 1988 and was regulated under RCRA and as NPDES outfall 001A between August 1983 and September 1991. Most of the waste discharged to the pond originated at the X-700 Chemical Cleaning Facility and the X-705 Decontamination Building. From 1974 until 1988, slaked lime was added to the X-701B influent at the X-701E Neutralization Facility to neutralize the low pH and induce precipitation. This precipitation caused large amounts of sludge to accumulate in the pond and necessitated periodic dredging of the sludge. The sludge recovered during dredging was stored in two retention basins located to the northwest of X-701B.

The X-701B East and West Retention Basins were unlined sludge retention basins used for the settling, dewatering and storage of sludge removed from the X-701B Holding Pond. The East Retention Basin built in 1973, was approximately 220 ft by 65 ft (narrowing to 25 ft wide in the northeast corner) and was 3.5 ft deep. The east basin was in use from 1973 until approximately 1980. The West Retention Basin was built in 1980, when the east basin reached capacity. The west basin was approximately 220 ft by 45 ft (narrowing to 35 ft wide in the northern portion) and was 3 ft deep. The west basin was in use from 1980 until 1988 (see Figure 5).

In 1989, PORTS initiated a two-phase closure of the unit. As part of the first phase, sludge was excavated from the holding pond and two retention basins. The sludge was dewatered, placed in containers and transported to on-site storage. The retention basins were backfilled, graded, and seeded. The second phase began in 1994, and included construction of a groundwater pump-and-treat system and in situ treatment of soils in the bottom of the holding pond with thermally enhanced vapor extraction (TEVE). Limestone riprap and gravel were placed on the bottom of the holding pond to support the soil treatment equipment. Several attempts were made to apply the TEVE technology which failed due to the geological conditions at the unit. However, the limestone riprap and gravel material currently remains in the holding pond, and a gravel access road remains on the southeast side of the holding pond. Two pumps in a sump located in the low point of the holding pond, which have the ability to dewater the pond, remain operational. The water removed by these two pumps is transferred, via underground piping, directly into the X-623 Groundwater Treatment Facility.

During 1997 and 1998, an investigation in the X-701B Retention Basin area revealed that the saturated fill material in the retention basins was contaminated with uranium and technetium at concentrations that exceeded PRGs. In addition, detectable concentrations of transuranics were discovered. An evaluation of surface and subsurface radionuclide data in this area indicates there is no correlation between the sporadic detections of surface contamination and contamination found in the saturated fill material. Therefore, the higher radionuclide concentrations found in the fill material are believed to be the result of incomplete removal of sludge during initial closure actions at the retention basins. Existing data does not indicate that radioactive contaminants are migrating from the retention basins to either surface water or groundwater at concentrations exceeding PRGs. However, U.S. DOE continues to sample this area and data is continuously evaluated. Only groundwater samples were collected in this area during the RFI. Therefore, no assessments were performed to evaluate the risk of exposure to contaminants in soils. The X-701B Holding Pond and Retention Basins were integrated into the CAS/CMS process in the Director's Final Findings and Orders for Integration (DFF&Os) journalized on March 24, 1999.

5.3 X-701B HOLDING POND AND RETENTION BASINS

REMEDIAL ACTION OBJECTIVES

The X-701B SWMU RAOs for soil are as follows:

- Prevent exposure of on-site personnel to COCs in soil at concentrations exceeding PRGs,
- Prevent exposure of ecological receptors to COCs exceeding PRGs; and
- Prevent migration of vadose zone contaminants from soil into groundwater.

The COPCs for the X-701B SWMU soil include any chemical detected in soil at concentrations exceeding analytical detection limits. In the Quadrant II RFI, COPCs were used to model risk. The COPCs exceeding the screening criteria described in the CAS/CMS were retained as COCs. Table 6.1in the CMS Report and Table 1 of this document presents the soil COCs and respective PRGs. TCE, technetium and uranium have been selected as the primary COCs for remediation because they have been detected in soils throughout the area, both horizontally and vertically.

Table 1 Soil COCs,
X-701B Holding Pond and Retention Basins

Contaminant of Concern	Selected soil PRG (mg/kg)
Americium-241	7.9 pCi/g
Arsenic	10
Beryllium	1.4
Nickel	34
Plutonium-239/240	9.9 pCi/g
Technetium	11,400 pCi/kg
Uranium	7.4
2-Butanone (MEK)	1.8
Benzene	0.015
Cis-1,2-Dichloroethene	0.12
Tetrachloroethene	0.27
Toluene	7.7
Trichloroethene (TCE)	0.048
Vinyl Chloride	0.012

mg/kg = milligram per kilogram

pCi/kg = picocuries per kilogram

pCi/g= picocuries per gram

5.4 AREA OF CONCERN, TYPES OF CONTAMINATION, AND VOLUME ESTIMATES

Area of Contamination

Soil samples were collected from several soil borings near this unit during both Phase I and Phase II investigations for the RFI.

Volume Estimates

For cost-estimating purposes, the volume of soil with contaminants at concentrations exceeding PRGs was estimated for the area associated with the X-701B Holding Pond and Retention Basins. In Alternative 2, the horizontal extent of contamination was assumed to be 2 ft beyond the edges of the retention basins and radiating 10 ft from each of the data points in the holding pond. The vertical extent of contaminants was assumed to be at the bottom of the retention basins and at the lowest depth of the data points in the holding pond. The estimated volume of contaminated soil for removal in Alternative 2 is 3,240 yd^3. In Alternative 3, excavation of the two northernmost points of contamination is required. The estimated volume of contaminated soil for removal in Alternative 3 is 16 yd^3, the volume of soil estimated for the soil removal activities in Alternative 5 is 31,000 yd^3. It is assumed that the majority of the contaminated soils from the holding pond and retention basin will be removed in Alternative 5. All excavated soil from this SWMU is assumed to be mixed waste.

5.5 DEVELOPMENT AND DETAILED ANALYSIS OF ALTERNATIVES

A series of Decision Team meetings involving U.S. DOE, U.S. EPA, and Ohio EPA have resulted in a site remediation strategy emphasizing soil and groundwater remediation for the X-701B SWMU as the focus for corrective measures under the Ohio Consent Decree, the 1997 3 party Order and the 1999 Integration Administrative Order on Consent. This strategy acknowledges the RCRA corrective actions that have occurred since 1989 at PORTS (through the RCRA closure process).

A range of potentially viable remedial alternatives has been assembled for the X-701B Holding Pond and Retention Basins by using the representative process options presented and selected in this

section. All alternatives were selected for their abilities to meet RAOs, address all environmental problems, reduce overall risk, and protect human health and the environment. An alternative has been assembled for each of the following categories: institutional controls, removal, and capping. The remedial alternatives for soils at the X-701B Holding Pond and Retention Basins are as follows:

Alternative 1 - Institutional Controls (Soils)

Deed restrictions to limit land development and access controls to prevent exposure to contaminated soils are included in this alternative.

Alternative 2 - Institutional Controls and Removal (Soils)

Future land use at the area associated with the X-701B Holding Pond and Retention Basins will be limited to commercial/industrial activities through deed restrictions that would prevent development of the excavated area. Contaminated soil will be removed to the base of the retention basins and to depths where contaminants exceed their PRG. The horizontal extent of contamination will be addressed by excavating 2 ft beyond the edges of the retention basins and 10 ft from data points in the holding pond where contaminants exceed PRGs. Excavated soil will be evaluated to determine the proper disposal method, but is assumed to be a mixed waste for the purposes of the CMS Report and this document.

Alternative 3 - Institutional Controls, Select Removal and Capping (Soils)

Select solids excavation and backfilling in conjunction with capping is included in this alternative. For purposes of this document and the CAS/CMS, the cap will be engineered to meet RCRA Subtitles C and D and Ohio Hazardous Waste and Solid Waste requirements. For cost estimating purposes, a cap meeting Ohio Solid Waste construction specifications has been used; however, the final cap specifications will be determined as part of the CMI. There will be selected excavation of soil in outlying areas where there have been sporadic detections of contaminants. Institutional controls include deed and access restrictions. The existing storm sewer will not be re-routed around the capped area as noted in Alternative 6 below.

Alternative 4 - Institutional Controls (Soils)

This alternative includes deed restrictions to limit land development and access controls to prevent exposure to contaminated soils. Alternative #4 is very similar to Alternative #1.

Alternative 5 - Institutional Controls and Removal (Soils)

The pond and retention basins will be excavated to a maximum depth of 15 ft from the existing grade to remove contaminants exceeding preliminary remedial goals (PRGs). The horizontal limits of excavation will extend 2 ft beyond the edges of the retention basins to 10 ft beyond data points, including outlying sample locations, where contaminants exceed PRGs in soil. The excavated area will be partially backfilled, as needed, and graded to drain into the existing drainage ditch north of the holding pond. The soil excavated will be containerized and shipped off-site for disposal as low-level radioactive waste (LLW). Soil from beneath the X-701B Holding Pond will be segregated and shipped off-site as mixed (hazardous and LLW) waste. An existing storm sewer will be modified to drain through the excavation area and drainage ditch. The existing monitoring, injection, and extraction wells and X-701E Neutralization Building will be relocated. Institutional controls include deed and access restrictions.

Alternative 6 - Institutional Controls, Select Removing and Capping (Soils)

An engineered cap meeting RCRA Subtitles C and D and Ohio Hazardous Waste and Solid Waste requirements will be placed over the pond and basins. The cap will extend 25 ft beyond the limits of the pond and basins. Outside of the capped area, soils that have contamination exceeding PRGs will be excavated (maximum excavation depth of 15 ft) and placed under the cap. The existing storm sewer will be re-routed to the north of the capped area. The existing monitoring, injection, and extraction, and extraction wells and X-701E Neutralization Building will be relocated. Institutional controls include deed and access restrictions.

Alternative 7 - Institutional Controls and On-site Disposal (Soils)

Excavate the holding and retention basins to a maximum depth of 15 ft and horizontal limits of excavation extending 2 ft beyond the holding pond and retention basin. In addition, excavate surrounding areas that have been identified as exceeding the established PRGs to a maximum depth of 15 ft. The excavation resulting from the removal of the holding pond and the East Retention Basin will be converted to an engineered disposal cell, with a leachate collection system, a liner system, and engineered cap. The disposal cell will have the capacity to accept all excavated materials for the X-701B Holding Pond and Retention Basins area. The existing

monitoring, injection, and extraction wells and X-701E Neutralization Building will be relocated. Institutional controls include deed and access restrictions.

Alternative 8- Institutional controls, Select removal, and Capping with Piping System Relocation (Soils)

This Alternative is essentially the same as Alternative 6 except for the additional piping to be installed for future groundwater remedial purposes - An engineered cap meeting RCRA Subtitles C and D and Ohio Hazardous Waste and Solid Waste requirements will be placed over the pond and basins. The cap will extend 25 ft beyond the limits of the pond and basins. Outside of the capped area, soils that have contamination exceeding PRGs will be excavated (maximum excavation depth of 15 ft) and placed under the cap. The existing storm sewer will be re-routed to the north of the capped area. The existing monitoring, injection, and extraction, and extraction wells and X-701E Neutralization Building will be relocated. Institutional controls include deed and access restrictions will be instituted. The existing drain pumps located in the holding pond will remain in place and additional piping will be installed for use with the existing piping system in a possible future remediation system, such as oxidant injection.

5.6 Hydrogeology of the X-701B Groundwater Area

The principal groundwater flow system for PORTS is limited to four primary geologic and hydraulic units (Minford, Gallia, Sunbury, and Berea). The uppermost unconsolidated unit is the Minford with an approximate thickness of 25 - 30 ft. The Gallia unit underlies the Minford and is relatively thick (6 - 12 ft) in the X-701B Groundwater Area. The Gallia and Minford comprise the unconsolidated aquifer at PORTS. Gallia groundwater flow in the X-701B Groundwater Area is assumed to be affected by the pumping of basement sumps in the X-705 building. The uppermost bedrock unit is the Sunbury Shale unit. The Berea Sandstone underlies the Sunbury shale and is the uppermost bedrock aquifer at PORTS. The Berea is present at approximately 35 feet below land surface in this area and groundwater flow is generally to the east.

The primary source of water in the hydrogeologic flow system in the X-701B Groundwater Area is natural recharge through precipitation. Leakage from storm sewers and other buried pipelines in the plant complex is not considered a significant source of recharge in the X-701B Groundwater Area. The rate of recharge varies across the site as a result of surface development (i.e., buildings, parking lots, or open fields) and also as a result of the thickness of the surficial

Minford clay. In general, a downward vertical gradient has been observed through each of the four major hydrogeologic units underlying the site. However, because the Sunbury Shale thins along the western portion of Quadrant II, communication between the Gallia and Berea is increased. The vertical gradient between the Gallia and Berea units is greatest where the Sunbury is thick, competent shale.

Natural groundwater flow beneath the X-701B Groundwater Area is directed to the east and northeast. The flow direction is the same for both the Gallia and Berea units. Groundwater flow direction in both the Minford and the Gallia are affected by the presence of drainage ditches and holding ponds, the most predominant areas being the X-230J7 Holding Pond and the East Drainage Ditch. Vertical hydraulic gradients in this area are generally downward except to the west in the vicinity of the X-700/X-705 buildings, where vertical gradients indicate possible upward flow from the Berea to the Gallia. This is due to thinning or absence of the Sunbury Shale in this area. Groundwater recharge to the Gallia and Berea in the X-701B Groundwater Area is reduced because of the many paved areas, buildings, and the presence of thick upper Minford Clay deposits. Pumping of groundwater from sumps located in the X-705 Decontamination Building has influenced water levels over a large portion of this area and modified the direction of groundwater flow (see Figure 6).

The area of contamination in the X-701B Groundwater Area, extends east from the vicinity of the former X-701B Holding Pond to the vicinity of Little Beaver Creek. (See Figure 5and 6). The plume width does not exceed 500 ft. TCE concentrations in the most contaminated portions of this plume exceed 100,000 µg/L.

5.6.1 X-701 B Groundwater Plume

U.S. DOE has developed and array of alternatives for the X-701B Groundwater Area plume in accordance with the requirements of the Ohio Consent Decree. Existing data are sufficient to support the development of groundwater remedial alternatives. During the Quadrant II RFI U.S. DOE sampled a number of groundwater wells in the area of the X-701B Plume. The groundwater plume at the X-744Y Waste Storage Yard will be addressed as part of the X-701B plume.

5.6.2 X-701B GROUNDWATER AREA RAOs

The RAOs for the X-701B Groundwater Area are as follows:

- Achieve PRGs for groundwater when practicable.
- Prevent migration of COCs at concentrations exceeding PRGs from groundwater into surface water.
- Prevent exposure of future off-site residents to COCs in groundwater at concentrations exceeding residential PRGs through potential exposure pathways.
- Prevent exposure of on-site personnel to COCs in groundwater at concentrations exceeding future on-site worker PRGs through potential exposure pathways.

The contaminants of potential concern (COPCs) for groundwater in the X-701B Groundwater Area include any chemical detected in groundwater during the RFI and subsequent sampling at concentrations exceeding analytical detection limits as noted in the approved CMS. The COPCs exceeding the screening criteria described in Chapter 3 were retained as COCs. Arsenic, barium, beryllium, copper, 2-butanone, bromodichloromethane, toluene, neptunium, radium, and thorium in the Gallia aquifer and all constituents listed as COCs in the Berea aquifer, except 1,1,2-trichloroethane, were each detected above PRGs at one location in a single sample. As such, these contaminants do not appear to present a risk to potential receptors due to their limited vertical and areal extent. TCE has been selected as the primary COC for groundwater in the X-701B Groundwater Area because of its widespread occurrence. Tables 4 and 5 present the COCs and their PRGs for Gallia and Berea groundwater, respectively.

Table 2 Gallia Groundwater COCs
X-701B Groundwater Area

Contaminants of Concern	Gallia Groundwater PRG (µg/L)
Arsenic *	92
Barium *	2000
Beryllium *	6.5
Cadmium	6.5
Chromium	100
Copper *	21
Lead	50
Manganese	14300
Nickel	100
Silver	50
Thallium	10.5
Bis(2-ethylhexyl)phthalate	6
1,1,1-Trichloroethane	200
1,1,2,2-Tetrachloroethane	83
1,1,2-Trichloroethane	5
1,1-Dichloroethene	7
1,2-Dichloroethane	5
1,2-Dichloroethene	900
2-Butanone *	53800
Acetone	10200
Bromodichloromethane *	100

Table 2 Gallia Groundwater COCs
X-701B Groundwater Area (Continued)

Contaminants of Concern	Gallia Groundwater PRG (µg/L)
Carbon Tetrachloride	5
Chloroform	100
Methylene Chloride	5
Tetrachloroethene	5
Toluene *	1000
Trichloroethene	5
Vinyl Chloride	2
Uranium	20
Neptunium *	0.54 pCi/L
Radium *	0.65 pCi/L
Technetium	3790 pCi/L
Thorium *	2.5-4.9 pCi/L

***Indicates a single detection**

Table 3 Berea Groundwater COCs
X-701B Groundwater Area

Contaminants of Concern	Berea Groundwater PRG (µg/L)
2,4-Dinitrotoluene *	0.397
Hexachlorobenzene *	1
Hexachlorobutadiene *	3.7
Pentachlorophenol *	1
1,1,2-Trichloroethane	5
Acrolein *	1.03
Methylene Chloride *	5
Trichloroethene *	5

***Indicates a single detection**

5.7 Remedial Alternative Evaluation

For cost estimating purposes, on-site treatment includes capital costs, permitting for air emissions discharge, and purchase of necessary supplies to perform the treatment.

The remedial alternatives for groundwater at the X-701B Groundwater Area include the following:

Alternative 1 - No Action (Groundwater)

The no action alternative is retained throughout alternative analysis and evaluation to serve as a basis for comparison with other alternatives. Under the no action alternative, no treatment, containment, removal, or monitoring of the environmental media would be performed. Unrestricted access to PORTS in its current condition would be allowed, and no present or future restrictions on access or land use would be implemented.

Alternative 2 - No Further Corrective Action (Groundwater)

Institutional controls for Alternative 2 include deed and access restrictions and groundwater monitoring. Deed restrictions would prevent residential development in the X-701B Groundwater Area. Current pumping conditions would remain. Groundwater monitoring would be initiated to aid in the assessment of contaminated groundwater migration beyond current plume boundaries. The groundwater monitoring program would use existing monitoring wells to monitor contaminant fate and transport.

Alternative 3 - Oxidant Injection/Vacuum Enhanced Recovery/Phytoremediation (Groundwater)

Alternative 3 includes implementation of three remedial technologies in the X-701B Groundwater Area. An oxidant solution would be injected in the western portion of the plume (west of Perimeter Road). VER wells would be used to extract vapor and groundwater in the central portion of the plume (east of Perimeter Road). Poplar trees would be planted in the eastern portion of the plume both east and west of the IRM trench to promote phytoextraction of groundwater. Several groundwater extraction wells would be used to control the direction of groundwater flow. Deed restrictions would prevent residential development and the use of groundwater from the area for any purpose. Groundwater monitoring would be initiated to assess the effectiveness of this alternative. The groundwater monitoring program would use existing monitoring wells to monitor contaminant fate and transport.

Alternative-specific assumptions.

(1) The Oxidant Injection system will include:

- Lance permeation to the Gallia ~ 32 ft below ground surface
- Lance placement will be on a regular grid with 10-ft spacing.
- Grid will cover approximately 90,000 ft^2 in the X-701B Holding Pond area.
- Oxidant is injected at two times, 0 years and 1 year.
- From 2 to 10 years groundwater is extracted.
- Oxidant injection will effectively remove all contaminants over a 90,000 ft^2 area.

(2) The VER system will include:

- Depth of deep extraction wells: 15 wells extending to the bottom of the Gallia (average depth 30 ft below ground surface).
- Screen length of deep extraction wells is 10 ft.
- VER system operation is from 0 to 2 years with estimated groundwater and vapor extraction rates according to rates presented in Appendix E.
- From 2 to 10 years groundwater is extracted (no vapor). From 10 to 30 years no VER system operation (monitoring only).
- VER wells will effectively remove all contamination within a 75-ft radius of the well.

(3) The Groundwater Extraction system will include:
Depth of deep extraction wells: 3 wells to 25 ft below ground surface.
Screen length of deep extraction wells is 10 ft.
System would operate from 10 to 30 years.

(4) The Phytoremediation system will include:
Planting of hybrid poplar trees in year 0.
100 trees would be planted over 2.1 acres (lower than typical tree density due to shallow groundwater table and the limited groundwater available).
Monitoring shall be conducted at 35 existing monitoring wells.

The X-705 sumps and the X-701B IRM trench continue to operate for the entire 30-year simulation.

Alternative 4 - VER and Steam Stripping (Groundwater)

Alternative 4 includes VER, steam stripping, and use of the existing groundwater monitoring wells. Steam stripping includes steam injection and groundwater extraction, which will be used to eliminate groundwater contamination in the X-701B Groundwater Area plume west of the Perimeter Road. Deed restrictions would prevent residential development and the use of groundwater from the area for any purpose. Groundwater monitoring would be initiated to assess the effectiveness of this alternative. The groundwater monitoring program would use existing wells to assess contaminant fate and transport.

Alternative-specific assumptions.

(A) Twenty-four VER wells will be installed.

(B) All VER wells will operate for two years and will effectively remove all contamination within a radius of 75 ft of the well.

(C) Steam stripping will operate for two years and eliminate groundwater contamination in the portion of the X-701B Groundwater Area plume west of Perimeter Road. The mass of injected steam is approximately equal to the mass of extracted groundwater in the area west of Perimeter Road.

(D) Groundwater will be treated at existing facilities.

(E) The X-705 sumps and the X-701B IRM trench continue to operate for the entire 30-year simulation.

Alternative 5 - VER (Groundwater)

Alternative 5 includes institutional controls, use of the existing groundwater monitoring wells and the installation of 39 VER wells. Deed restrictions would prevent residential development and the use of groundwater from the area for potable water supplies. Groundwater monitoring would be continued to assess the effectiveness of this alternative.

Alternative-specific assumptions.

(A) Thirty-nine VER wells will be installed.

(B) All VER wells will operate for two years and will effectively remove all contamination within a radius of influence of 75 ft.

(C) Twenty-five VER wells will operate as conventional extraction wells for an additional 28 years.

(D) The X-705 sumps and the X-701B IRM trench continue to operate for the entire 30-year simulation.

(E) Groundwater will be treated at existing facilities.

Alternative 6 - Groundwater Extraction and Bioremediation (Groundwater)

Alternative 6 includes installation of nine conventional extraction wells and use of enhanced bioremediation. Deed restrictions would prevent residential development and the use of groundwater from the area for any purpose. Groundwater monitoring would be initiated to assess the effectiveness of this alternative. The groundwater monitoring program would use existing monitoring wells to monitor contaminant fate and transport.

Alternative-specific assumptions.

Use of enhanced bioremedial techniques in the eastern area of the X-701B Groundwater Area plume completely eliminates contamination in a 160,000 ft^2 area within 2 years.

(A) The X-705 sumps and the X-701B IRM trench continue to operate for the entire 30-year simulation.

(B) Nine conventional wells operate for the entire 30-year simulation.

(C) Groundwater will be treated at existing facilities.

Alternative 7 - Oxidant Recirculation (Groundwater)

Alternative 7 includes installation of 30 extraction wells and 17 injection wells and utilization of an aboveground oxidant injection system. Contamination reduction would be achieved in the first six months of this simulation. Reduction would be accomplished by extracting groundwater, circulating it through the aboveground oxidant injection system, and reinjecting the treated groundwater into the injection wells where the oxidant would reduce residual soil contamination as well as groundwater contamination. Deed restrictions would prevent residential development and the use of groundwater from the area for any purpose. Groundwater monitoring would be initiated to assess the effectiveness of this alternative. The groundwater monitoring program would use existing monitoring wells to monitor contaminant fate and transport.

Alternative -specific assumptions

(A) Introduction of oxidants throughout the X-701B groundwater area plume eliminates contamination in a 430,000 ft^2 area within 2 years.

(B) The oxidant injection system would operate for six months.

(C) The X-705 sumps and the X-701B IRM trench would continue to operate for the entire 30-year simulation.

All model assumptions used to evaluate the alternatives listed above are in Appendix E of the Quadrant II CAS/CMS.

Alternative 8- Oxidant Injection/Extraction/Recirculation and Phytoremediation (Groundwater)

Alternative 8 consists of oxidant injection through vertical and possibly horizontal wells into the Gallia and Sunbury formations in the western portion of the plume. The oxidant will be recirculated through wells in the western portion of the groundwater plume extending from the security fence to the east and to Brown Avenue to the west. The injection would be phased over a period of time concentrating on the upgradient contamination first. The injection process would take place over at least a two year period during and after which additional sampling would occur to determine if continuation oxidant injection will be necessary.

The oxidant would also be injected through the existing horizontal wells to attempt to remediate the dissolved phase of the TCE plume extending throughout the area between the eastern horizontal well and the existing collection trench. The collection trench will continue to operate until PRGs are met in the groundwater throughout the plume.

The alternative also includes a phytoremediation component at the eastern most portion of the plume which exists between the existing recovery trench and Little Beaver Creek. Currently, there are numerous trees in the area and phytoremediation may be ongoing. If additional trees are needed, hybrid Poplar trees may be planted in a row(s) perpendicular to the plume such that the roots systems would capture and extract the contaminated groundwater. The additional trees would be planted to enhance the phytoremediation which may already be ongoing.

Alternative 8 was developed in order to address the most recent data regarding TCE concentrations in the groundwater plume.

6.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Under CERCLA, remedial alternatives are required to be evaluated against eight criteria. To select remedial alternatives for the X-701B SWMU, Ohio EPA considered these eight criteria, which are described below.

1. **Overall protection of human health and the environment** addresses whether a remedy provides adequate protection through the elimination, reduction, or control of risks by treatment, engineering controls, or institutional controls.

2. **Compliance with state, federal, and local laws and regulations** addresses whether a remedy will meet all applicable state, federal, and local environmental statutes (ARARs). ARARs include chemical-, action-, and location-specific ARARs.

3. **Long-term effectiveness and permanence** refers to a remedial alternative's ability to protect human health and the environment over time once cleanup goals have been met.

4. **Reduction of toxicity, mobility, or volume of contaminants** through treatment is the anticipated performance of the treatment technologies to either (1) reduce the toxic characteristics of the COCs, (2) remove quantities of COCs to acceptable risk concentrations or regulatory limits, or (3) decrease the ability of contaminants to migrate through the environment.

5. **Short-term effectiveness** involves the period of time needed to achieve protection and considers adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. **Implementability** is the technical and administrative feasibility of an alternative, including the availability of goods and services needed to implement the chosen remedial alternative.

7. **Cost** includes consideration of the capital and O&M costs.

8. **State and local community acceptance** will be assessed in the decision document after review of the public comments received on the RFI report, the CAS/CMS report, and this Preferred Plan.

Alternatives selected reflect the scope and purpose of the actions being undertaken at the X-701B SWMU and how the remedies relate to long-term comprehensive response. The following discussion summarizes how the alternatives address these criteria.

6.1 EVALUATION OF THE EIGHT CRITERIA FOR THE X-701B SWMU

SOILS -

The X-701B Holding Ponds and Retention Basins

1. Overall Protection of Human Health and the Environment

Alternatives 1 and 4 (Soils) - Institutional Controls would not be protective of human health and the environment because it remains unclear if long-term land-use restrictions could be implemented at the SWMU to address all potential exposure pathways including workers. In addition, contaminants are not prevented from leaching into groundwater, creating an exposure pathway for potential future users and potentially lending to migration of contaminated groundwater to Little Beaver Creek.

Alternative 2 (Soils)- Institutional Controls and Removal would be protective of human health and the environment because soil removal is an effective and reliable method to prevent direct contact with affected soil and eliminates infiltration and contaminant transport. This alternative may not meet all remedial action objectives (RAOs) because of the limited amount of soil removed (approximately 3,240 yd^3) and it is unclear if long-term land use restrictions could address all potential exposure pathways including on-site workers.

Alternatives 3 & 6 (Soils) - Institutional Controls, Select Removal and Capping would be protective of human health and the environment. Capping is an effective and reliable method to prevent direct contact with affected soil and eliminate infiltration and contaminant transport into the groundwater. The removal of soil is an effective and reliable method to prevent direct contact

with contaminated soils. Alternative 6 would require the re-routing of the drainage lines around the capped area. Both the cap and soil removal will greatly reduce potential exposure of human and ecological receptors. Alternative 3 would not meet the substantive requirements of RCRA becuase the drainage lines would be left beneath the capped area. These Alternatives would meet RAO's.

Alternative 5 (Soils)- Removal and excavation of 31,000 yd^3 of soil would not directly impact ecological receptors or habitat. Control measures such as silt fences, erosion control, and dust prevention would be implemented to ensure that human and ecological receptors and habitat surrounding PORTS would not be adversely impacted. Soil removal is an effective and reliable method to prevent direct contact with affected soil and eliminates infiltration and contaminant transport into the groundwater. Deed and land use restrictions would limit exposure to current and future workers as well as the general public.

Alternative 7 (Soils)- Institutional controls and on-site disposal would eliminate the migration of and surface exposure to contaminants. The constructions of a waste cell and cap would reduce infiltration of surface water and contaminants leaching into the groundwater. Access restrictions (i.e. signs and fences) will control access to selected areas. Institutional controls such as deed and land use restrictions will restrict this area to industrial development only and prohibit development or modification of the capped area.

Alternative 8 (Soils)- Institutional controls, Select Removal and Capping with Piping System relocation would be protective of human health and the environment Alternative 8 would relocate contamination and cap the contaminated soil area. Alternative 8 also includes installation of a piping system to address remediation of groundwater should it be needed. Capping is an effective and reliable method to prevent direct contact with affected soil and eliminate infiltration and contaminant transport. The piping system relocation would prevent surface water from discharing from under the capped area and flow directly into the East Drainage Ditch. The relocation would prevent potential damage to the on site disposal cell and cap should anything happen to the discharge pipe. Access restrictions (signs and fences) will control access to selected areas. Institutional controls such as deed restrictions will restrict this area to industrial development only and prohibit development or modification of the capped area.

2. **Compliance with State, Federal, and Local Laws and Regulations**

Chemical-Specific ARARs (Soil): Alternatives 1,2 and 4 would not comply with chemical specific ARARs or RCRA ARARs. Alternative 2 would leave some areas of contamination exposed therefore allowing contaminants to continue to migrate into the groundwater. Alternative 3 would comply with the chemical specific ARARs but not the substantive requirements of RCRA (i.e. minimize maintenance) because the surface water drainage will remain beneath the capped area. Alternatives 5, 6, 7,and 8 would comply with all chemical specific ARARs as well as the substantive requirements of RCRA.

Action-Specific ARARs (Soil): Alternatives 2 & 3 would require that all contaminated soils removed be properly disposed of a hazardous waste facility. Alternatives 5, 6 , 7 and 8 would require that all contaminated soil be disposed of properly either on site or at an off site disposal facility. The waste would need to be properly stored on site if no facility is available to take the waste (i.e. LLW).

Location-Specific ARARs: None of the alternatives evaluated would trigger location specific ARARs. Therefore these ARARs are not applicable for this SWMU.

3. **Long-Term Effectiveness and Permanence (Soils)**

Alternatives 1 and 4 may be effective in reducing exposure of future on-site workers if institutional controls can be maintained in perpetuity. Alternative 4 also relies on deed and land use restrictions to prevent exposure and direct contact with the contaminants. The long term enforceability and resulting reliability of deed and land use restrictions can not be assured. Maintaining this level of institutional controls in perpetuity is problematic. Alternatives 1 and 4 would not prevent potential exposure of ecological receptors or continuing contamination of groundwater.

Alternatives 2 and 5 would be reliable alternatives due removal of contaminants. These alternatives would require operation and maintenance (O&M) efforts to maintain and uphold the integrity of the backfilled area. Alternative 2 leaves contaminants in place outside the capped area therefore the long-term effectiveness and permanence is not assured. Alternative 5 would be more effective in meeting the requirement for long-term effectiveness and permanence due to the amount of contaminated soil removed from the area. This alternative would also require limited

O&M to maintain the regraded area.

Alternative 3 is also expected to meet the long term effectiveness and permanence criteria. This Alternative would require O&M efforts to maintain and uphold the integrity of the backfilled and capped area as well as the drainage pipe below the cap.

Alternatives 6, 7 and 8 are also expected to meet the long term effectiveness and permanence criteria although Alternative 5 does this to a greater degree because the contaminants would be removed from the area. Alternatives 6 & 8 require the re-routing of the surface drainage lines around the capped area. Alternative 8 would require O&M for the installed piping that could be used to address the groundwater contamination should it become necessary. These alternatives would require O&M efforts to maintain the cap. Alternatives 3, 6, 7 and 8 will require the long term O&M of a disposal cell as well as a cap. The alternatives described above would not reduce the contaminant mass but would prevent infiltration of surface water as long as the caps are properly maintained. These alternatives will prevent direct contact with contaminated soil and will reduce contaminant transport.

4. **Reduction of Toxicity, Mobility, or Volume Through Treatment (Soils)**

Alternatives 1 and 4 would not reduce the toxicity, mobility or volume of the soil contaminants because there is not treatment or removal of contaminants. Alternative 2 does not include treatment to reduce toxicity, mobility or volume of contaminated media. A limited amount of contaminants would be removed from the area and no further action would be implemented. Alternative 3 would not include treatment to reduce the toxicity, mobility or volume of contaminated media. Alternative 3 is considered a containment option. Alternative 5 would be considered the most effective in reducing toxicity, mobility and volume since the alternative calls for the excavation and removal of contaminated soil assuming off site treatment occurs. Alternatives 6, 7 and 8 are considered containment options since the contaminants remain on site below an engineered cap. The mobility of contaminants would be reduced via containment due to the lack of contact with precipitation limiting the amount of downward movement of contaminants. Alternative 6 does implement some removal therefore slightly reducing the toxicity, mobility and volume of contaminants in the area if treatment is included.

5. **Short-Term Effectiveness (Soils)**

Minimal short-term risks to neighboring populations are associated with any of the selected alternatives. Alternatives 1 would pose no short term human exposure risks other than continued risks to on-site workers. Alternatives 2 & 3 would prevent some short term exposure risks to remediation works and current on site workers during construction activities. Exposure could be controlled and greatly reduced by implementation of a site-specific health and safety plan. ALARA principals would be observed to limit and prevents exposure of workers to contaminants.

Alternatives 6 and 8 include site-specific hazards and those commonly associated with general construction projects and use of construction equipment. Alternatives 5 and 7 would present an increased short-term potential hazards to on-site workers, due to significant health physics concerns raised by the necessity of dust control to contain wind-blown radioactive dust from contaminated soil during excavation activities. Alternative 5 presents the greatest short-term potential hazards, since wetting the soil for dust control will need to be minimized for all excavated soil, which will be shipped off-site for disposal. Exposure could be controlled and greatly reduced by implementation of a site-specific health and safety plan. As low as reasonably achievable (ALARA) principals would be observed to limit and prevent exposure of workers to contaminants.

6. **Implementability (Soils)**

Alternatives 1 and 4 require minimal remedial activities. Alternatives 1and 4 would be the most easily implemented alternatives and would require the least amount of time to implement.

Alternatives 2 and 5 would require removal of the debris and associated soil, and backfilling of the area with clay. The O&M would be minimal and would involve monitoring the integrity of the backfill. The time required to implement Alternative 2 is approximately 9 - 12 months. Alternative 5 will present difficulty in implementation. Extensive planning will be required for the containment of wind blown radioactive dust from excavated soil. Planning will also be required for evaluating off site disposal locations as well as shipment requirements. Alternative 5 would also take 9 to 12 months to implement.

Alternative 3 would require the selective removal of contaminated soil and backfilling of the area with clay. The O&M would require monitoring the integrity of the cap and the backfill. The time required to implement Alternative 3 is approximately 11-15 months.

Alternative 6 and 8 would require the selective removal of soil and capping of the remaining contaminated area. These alternatives are readily implementable. Several caps have been installed on the site and the requirements have been well established. Alternative 8 would require the installation of a piping system in addition to the cap. These alternatives would take between 11 and 15 months to implement. Alternative 8 would take the longest of the two.

Alternative 7 requires the construction of an on site disposal cell and the re-routing of the existing storm sewer. Implementation of alternative 7 would require containment of wind-blown radioactive dust from contaminated soil excavated from this area. A cap is also required for this alternative. The time to implement this remedy would be longer due to these factors. Alternative 7 would take approximately 18 to 24 months to implement.

7. Cost (Soils)

The cost for each alternative is broken down below. Costs are presented in descending order.

Alternative 5 -	Present worth capital Cost	$ 28,267,000
	Present worth O&M Cost	$98,000
	Total Cost	$28,365,000
Alternative 7-	Present worth capital Cost	$ 9,581,000
	Present worth O&M Cost	$98,000
	Total Cost	$9,679,000
Alternative 8-	Present worth capital Cost	$4,391,000
	Present worth O&M Cost	$98,000
	Total Cost	$4,489,000
Alternative 6	Present worth capital Cost	$ 4,343,0000
	Present worth O&M Cost	$98,000
	Total Cost	$4,441,000

Alternative 2:	Present worth capital cost	$4,012,000
	Present worth O&M cost	$ 103,000
	Total Cost	$4,115,000
Alternative 3:	Present worth capital cost	$3,401,000
	Present worth O&M cost	$103,000
	Total Cost	$3,504,000
Alternative 4-	Present worth capital Cost	$229,000
	Present worth O&M Cost	$98,000
	Total Cost	$327,000
Alternative 1:	Present worth capital cost	$ 68,000
	Present worth O&M cost	$ 103,000
		$171,000

8. COMMUNITY ACCEPTANCE

Ohio EPA and U.S. EPA evaluated state and local community acceptance during the public comment period. All comments pertinent to the preferred alternatives were addressed during the public meeting and in the responsiveness summary of this decision document in Appendix IV.

6.2 EVALUATION OF THE EIGHT CRITERIA FOR THE X-701B SWMU (GROUNDWATER)

X-701B Groundwater Plume

The remedial action objectives for the **X-701B Groundwater Plume** are as follows:

(A) Achieve PRGs for groundwater whenever practicable;

(B) Prevent migration of COCs at concentrations exceeding PRGs (human health and ecological) from groundwater to surface water;

(C) Prevent exposure of future off-site residents to COCs in groundwater at concentrations exceeding residential PRGs;

(D) Prevent exposure of on-site workers to COCs in groundwater at concentrations exceeding future on-site worker PRGs.

1. Overall Protection of Human Health and the Environment (Groundwater)

Alternative 1 (Groundwater)- No action--would not be protective of human health and the environment and would not meet any of the clean up objectives for the area.

Alternative 2 (Groundwater)- No further action--includes deed and land use restrictions, in combination with groundwater capture and treatment. This alternative may reduce the likelihood of exposure of current and future on site workers and the general public to contaminated groundwater. This alternative is dependent on the ability to operate and maintain existing remedial measures and to maintain deed and land use restrictions. This alternative would not meet the clean up objectives (PRGs) in this area.

Alternative 3 (Groundwater)- Oxidant Injection, Vacuum Enhanced Recovery/Phytoremediation–deed and land use restriction would greatly reduce the area of groundwater contamination. This alternative would reduce the likelihood of exposure of current and future on-site workers and the general public to contaminated ground water, through the use of active remediation, institutional controls and deed restriction to limit property use. Groundwater monitoring would continue while the remedy is ongoing. However, at the end of a 30 year period, a small area will exceed the PRG for TCE based on the information that was used to develop the groundwater alternatives for the purposes of the development of the Quadrant II CMS report.

Alternative 4 (Groundwater)- VER and Steam Stripping would significantly reduce the levels and area of groundwater contamination. Deed and land use restrictions in combination with VER and Steam Stripping would reduce the potential of exposure of current and future on-site workers and the general public to contaminated groundwater. However, at the end of a 30 year period, a small area will exceed the PRG for TCE based on the information that was used to develop the groundwater alternatives for the purposes of the development of the Quadrant II CMS report. Groundwater monitoring will continue until RAO's are met.

Alternative 5 (Groundwater)- VER would reduce the mass of groundwater contamination in this area. The use of deed and land use restrictions would limit exposure to current and future workers as well as the general public. Groundwater monitoring would continue throughout the entire lifespan of the remedy to ensure that the mass of contaminants continues to decrease. However, at the end of a 30 year period, a small area will exceed the PRG for TCE based on the information that was used to develop the groundwater alternatives for the purposes of the development of the Quadrant II CMS report.

Alternative 6 (Groundwater)- Groundwater Extraction and Bioremediation would decrease the volume of the contaminants in the groundwater. The use of deed and land use restrictions would prevent residential development in this area. Institutional controls would prevent exposure to current and future workers. The PRG for TCE in the Gallia ground water is not expected to be achieved with this technology based on the information that was used to prepare the groundwater model for the purposes of developing the Quadrant II CMS Report.

Alternative 7 (Groundwater) - Oxidant Recirculation through out the entire plume would reduce the total volume of contaminants in the ground water. However, at the end of a 30 year period, a small area will exceed the PRG for TCE based on the information that was used to develop the groundwater alternatives for the purposes of the development of the Quadrant II CMS report. Institutional controls should prevent exposure to on-site workers, and deed restrictions would prevent residential development. The groundwater monitoring program would use existing monitoring wells to monitor flow and transport.

Alternative 8 (Groundwater)- Oxidant Injection/Recirculation in the western portion focusing on the source areas and potentially utilizing the horizontal wells to inject and collect groundwater would reduce the total volume of contaminants in the groundwater. The use of the collection trench may be necessary for several years beyond the 30 year time line discussed in the CAS/CMS report in order to meet the PRGs outlined above. Phytoremediation to the west of the trench will help remediate and remove contaminants in the groundwater especially volatiles, greatly reducing the potential for contaminants to enter Little Beaver Creek. Institutional controls should prevent exposure to on-site workers, and deed restrictions would prevent residential development. The groundwater monitoring program would use existing monitoring wells to monitor flow and transport. This alternative was developed based on the most recent date developed by U.S. DOE.

2. **Compliance with State, Federal, and Local Laws and Regulations (Groundwater)**

Chemical-Specific ARARs: One such ARAR would be for the groundwater to meet PRGs throughout the plume, with the point of compliance being the unit boundary. All of the alternatives evaluated (except the no action) are expected to reduce contaminant levels in the groundwater to some degree. Groundwater Alternatives 3, 4, 5, 6, 7, and 8 are expected to achieve the groundwater remedial goals throughout some of the plume area. Alternatives 7 And 8 are expected to do a better job on minimizing the area of the gorundwater plume that remains above the PRGs.

Action-Specific ARARs: Under alternatives 3, 4, 5, 6, 7 and 8, an action specific ARAR for X-701B is the requirement that VOC - contaminated drill cuttings from installation of extraction or injection wells be disposed of in a solid waste landfill, or if necessary, to a hazardous waste facility. Also, for any alternative which may bring ground waters to the surface for treatment prior to discharge, NPDES permit requirements would apply. Air permits must be obtained for alternatives that utilize VER wells to treat soil and groundwater COCs. Reinjection of contaminated groundwater would require Agency approval. For Alternatives 3-8, such ARARs can be met with proper design.

Location-Specific ARARs: Location-specific ARARs do not apply to the alternatives evaluated for this SWMU. None of the alternatives would have adverse effects on archaeological resources, cultural resources, flood elevations, or critical habitats. No socioeconomic effects are anticipated from implementation of any of the alternatives.

3. **Long-Term Effectiveness and Permanence (Groundwater)**

Alternative 1 would not provide long-term effectiveness and permanence. Alternative 2 depends on institutional controls to prevent exposure of on-site and off-site residents as well as future on-site workers and would not meet PRGs. This alternative is, therefore, less protective in long term compared to Alternatives 3 through 7. Alternatives 3, 4, 5, 6, and 7 would effectively reduce contaminant levels to slightly above PRGs. Alternative 8 would significantly reduce contaminant levels but if groundwater exceeds PRGs after 30 years the collection trench will continue to be operated and maintained. These alternatives also rely on institutional controls to prevent exposure of current on-site workers. In addition, deed restrictions must be maintained to prevent future

residential use of this area.

4. Reduction of Toxicity, Mobility, and Volume through treatment (Groundwater)

Alternative 1 would not meet remedial action objectives. Alternative 2 would continue the operation of the X-701B IRM Trench, and the existing X-701B extraction system. This alternative would reduce the contaminant toxicity, mobility, and total volume through removal but would fail to meet clean up objectives. Alternatives 3-8 are more active in reducing the toxicity, mobility, and volume of contaminants in the ground water. Although PRGs for TCE in the groundwater may not be fully met within 30 years, these alternatives attempt to eliminate the source of the contamination, therefore limiting the amount of residual contamination.

5. Short-Term Effectiveness (Groundwater)

Alternatives that minimize the amount of contaminants in the soil and water that on-site workers could be exposed to through installation of wells and other remedial activities would provide the greatest degree of short term effectiveness. Alternatives 1 and 2 pose fewer risks in the short term because no construction activities are associated with these alternatives. Alternatives 3 through 8 would pose greater risks in the short term because of construction activities. These risks can be minimized through proper work safety procedures.

6. Implementability (Groundwater)

All the alternatives evaluated are readily implementable. Alternatives 1 and 2 require no additional remedial activities, would be the most easily implemented and would require the least amount of time to implement.

Alternative 3 uses oxidant injection, VER, and phytoremediation to remove and treat contaminated groundwater. All three technologies are proven and have been implemented in a wide variety of hydrogeologic settings. Time required to implement Alternative 3 is approximately 9-12 months.

Alternative 4 uses VER and Steam Striping to eliminate contamination in selected areas of the X-701B Area Plume during the first two years after implementation. This is followed by groundwater extraction. These technologies have been proven effective at the PORTS site as well

as other facilities. This alternative can be implemented in 11-15 months.

Alternative 5 uses VER to eliminate contamination in selected areas of the groundwater plume during the first two years after implementation. This alternative is followed by groundwater extraction. This alternative has been proven effective and can be implemented in 10-12 months.

Alternative 6 uses groundwater extraction and bioremediation to eliminate contamination in the groundwater at the X-701B Area Plume. Bioremediation must still be evaluated to determine if it is a feasible technology to use in this area of the facility. This alternative (if found feasible) could be implemented in 6-12 months.

Alternative 7, Oxidant Recirculation, This alternative uses off the shelf components. Standard drilling and construction equipment will be used and is readily available. Fugitive dust emissions must be considered for all construction activities, and air monitoring would be part of any such activities. This alternative if found feasible could be implemented in 12-18 months.

Alternative 8, Oxidant Injection/ Extraction/Recirculation and Phytoremediation, could be implemented in 12 to 18 months. Standard drilling and construction equipment will be used and is readily available. Fugitive dust emissions must be considered for all construction activities, and air monitoring would be part of any such activities.

7. Cost (Groundwater)

The cost for each alternative is broken down below. Costs are presented in descending order.

Alternative 8	Present worth capital cost	$42,096, 000
	Presents worth O&M costs	$24,547,000
	*Total Cost	$66,643,000
Alternative 4	Present worth capital costs	$10,516,000
	Present worth O&M costs	$16,003,000
	Total Cost	$26,519,000

Alternative 5	Present worth capital costs	$2,348,000
	Present worth O&M costs	$17,665,000
	Total Cost	$20,013,000
Alterative 7	Present worth capital costs	$1,560,000
	Present worth O&M costs	$17,315,000
	Total Cost	$18,875,000
Alternative 6	Present worth capital costs	$2,781,000
	Present worth O&M costs	$15,503,000
	Total Cost	$18,284,000
Alternative 3	Present worth capital costs	$9,167,000
	Present worth O&M costs	$7,218,000
	Total Cost	$16,385,000
Alternative 2	Present worth capital costs	$ 0
	Present worth O&M costs	$10,971,000
	Total Cost	$10,971,000
Alternative 1	No costs are associated with this alternative.	

*The costs for Alternatives 3-7 would be substantially higher had they taken into account the amount of DNAPL contamination as outlined in Alternative 8. Alternative 8 presents a more realistic accounting for the purposes of remedy selection and cost. Requiring U.S. DOE to make revisions to the CAS/CMS for Quadrant II would be expensive, and consume limited U.S. DOE budget dollars that are best used for remediation. Additionally, revisions to the CAS/CMS estimates would take time, and may delay the implementation of a remedy for an additional fiscal year. Please refer to the CMS Report and to Appendix III for an explanation of how the costs for the alternatives were derived.

8. Community Acceptance

Ohio EPA and U.S. EPA evaluated state and local community acceptance during the public

comment period. All comments pertinent to the preferred alternatives were addressed during the public meeting and in the responsiveness summary of this decision document.

7.0 OHIO EPA'S SELECTED ALTERNATIVES FOR X-701B SOIL AND GROUNDWATER

Ohio EPA has selected a modified version of Alternative 3 for soils and Alternative 8 for groundwater. Each of these alternatives is briefly discussed below. U.S. EPA has provided Ohio EPA with concurrence for the alternatives presented in this section.

7.1 X-701B Holding Pond and Retention Basins (Soils Only)

Ohio EPA's selected alternative for the X-701B Holding Pond and Retention Basins is a modified version Alternative 3 (Please refer to Figure 7). Alternative 3 consists of Institutional Controls, selective removal of soil, and containment (capping). Institutional controls include the use of deed and land use restrictions. The cap shall be engineered to meet the RCRA Subtitle C substantive requirements as noted in Ohio Administrative Code (OAC) 3745-56-28. Ohio EPA has determined that re-consolidation of soils is preferable in this instance rather than removal. U.S. DOE will consolidate contaminated soil under two caps. One cap will cover the X-701B Holding Pond and the eastern retention basin. The second cap will cover the western retention basin. Contaminated soils in this area beyond the foot print of the caps will be consolidated to fit under one or both caps. Prior to placement of the reconsolidated soil, the bottom of the holding pond will be filled with 8 feet of clean fill and a two-foot recompacted clay barrier, overlain by a flexible membrane liner. The purpose of the barrier layer and liner is to significantly reduce infiltration of contaminants to the ground water. This action will eliminate the need for the U.S. DOE to relocate the storm water drainage pipe located between the eastern and western retention basins as per soil Alternatives 6 & 8. Storm water or discharge pipes are not desirable beneath caps because they may require repair causing significant damage to the cap. Completion of all remedial activities associated with this unit will meet the substantive requirements of RCRA as noted in the Ohio EPA's Directors Findings and Orders for integration Section VI, Paragraph 2. All surface water drainage shall be directed around the caps. Culverts, drainage ditches or process lines shall not be placed under the cap in areas in which waste has come to be placed. Control measures such as silt fences, erosion control, and dust prevention will be implemented to ensure

that environmental receptors and habitats surrounding PORTS are not affected by construction activities. All activities required to treat the groundwater and DNAPL beneath the holding pond area and retention basins will be completed prior to installation of the cap.

Alternative 3 as modified by Ohio EPA will provide the best balance of trade-offs considering the criteria used to evaluate the alternatives presented in the CAS/CMS report. This alternative will be protective of human health and the environment in the short and long terms and is considered permanent as long as the integrity of the cap is maintained. U.S. DOE will periodically inspect the cap to ensure that it is performing as required. This alternative also will meet ARARs, be cost-effective, and provide long-term effectiveness. This alternative may be further modified as needed to ensure that the cleanup objectives for the X-701B SWMU are met. Specifics regarding the implementation of the remedy will be completed during the CMI and the design of the cap. Total cost of this alternative as modified is $3,000,000 based on discussion with U.S. DOE. The cost is more than anticipated in the CMS report for Alternative 3, but less than Alternative 8. This is due to the modification of the alternative.

7.2 X-701B GROUNDWATER AREA

Ohio EPA's selected alternative for the X-701B Groundwater Area is a modification of Alternative 8. Alternative 8 was submitted as an addendum to the CAS/CMS report in January 2003. Alternative 8 consists of oxidant injection, and groundwater recirculation in the western portion of the plume where the source area is believed to be located. This area is bounded by the security fence in the east and approximately Brown Avenue to the west (see Figure 8). The primary goal for injecting in this area is to eliminate the source of TCE where recent data suggests that a substantial DNAPL is present within the Gallia and Sunbury formations. Oxidant will be injected in those areas to accomplish that task. Sampling will be performed periodically to determine if the injection of oxidant has been effective and continues to be effective. Current pumping wells will be incorportated into the designs as needed.

The oxidant injection area will focus on the source area for the plume. The oxidant injection shall be performed for the entire thickness of the Gallia, and potentially into the upper Sunbury. Where necessary the oxidant injection may include areas within the Minford in the south west area of the X-701B holding pond. The frequency and number of oxidant applications shall be dependent on the residual COCs in the Minford, Gallia and Sunbury formations. The specific injection locations, number of injection points and the preferred oxidant(s) will be evaluated and

determined during the design. Should the sampling results of wells within the source area and the plume indicate the oxidant injection is no longer effective, modifications to the design may be necessary. The criteria for determining when oxidant injection is no longer effective shall be developed in the remedial design. It is expected that the remedy will be operated until PRGs are attained or sooner if Ohio EPA determines that the remedy is no longer effective in removing contaminant mass, and that the selected remedial technology cannot be improved to achieve mass removal.

U.S. DOE will also use the eastern horizontal well to inject oxidant into the plume. The purpose of injecting in this horizontal well is to remediate the portion of the plume which extends eastward from this well (near the security fence) to the interceptor trench. The interceptor trench will be operated and maintained until PRGs are met throughout the plume.

Additional phytoremediation willl be implemented throughout the area between the interceptor trench and Little Beaver Creek if necessary to enhance the phytoremediation that is ongoing. Hybrid Poplar trees will be planted east of the existing groundwater trench, if needed, to enhance the phytoremediation of groundwater. Phytoremediation will remediate any TCE in groundwater which exists beyond the trench and protect Little Beaver Creek from contamination. Deed restriction(s) will be implemented to prevent the use of groundwater for any purpose until remedial action goals are met.

The phytoremediation area will cover approximately 2.1 acres and will include additional planting if needed while U.S. DOE is actively remediating groundwater. Specific details regarding the implementation, schedule and certain aspects of the design of the remedy outlined above shall be evaluated during the Corrective Measures Implementation Plan (CMI) process.

U.S. DOE will continue to operate the collection trench until such time as the remedial goal for TCE in groundwater is met. The active remedy (oxidant injection) will be terminated when PRGs are attained or sooner if Ohio EPA determines that the remedy is no longer effective in removing contaminant mass, and that the selected remedial technology cannot be improved to achieve mass removal. After a minimum of 5 years of operation of oxidation injection, U.S. DOE may petition Ohio EPA for a determination whether the technology is no longer effective, and whether alternative measures or discontinuance of oxidant treatment is warranted. Modifications to this remedy in order to achieve the PRGS may include but are not limited to

alternatives discussed in the CAS/CMS report for Quadrant II.

Institutional controls, when enforced, are expected to effectively prevent exposure to people during the time this alternative is in operation. Deed and land-use restrictions will limit future land use, place limitations on excavation depths, and prohibit development of groundwater for use as a potable water supply. The groundwater monitoring program will use monitoring wells to monitor contaminant fate and transport. Groundwater will be monitored at least semi-annually or as needed during the start of the remedial process. The frequency of groundwater monitoring will be evaluated in the approved corrective measures implementation plan, and the monitoring results will be reported in the integrated groundwater monitoring annual report for the X-701B SWMU. The IGWMP will include sampling parameters and frequency. The parameters and frequency of monitoring may change as remediation progresses.

Alternative 8 will provide the best balance of trade-offs considering the criteria used to evaluate the alternatives presented in the CAS/CMS report. Ohio EPA believes that this remedy will be protective of human health and the environment both in the short term and over the long term. This alternative will meet ARARs, be cost-effective, and provide long-term effectiveness. The cost for this remedy as modified is $19,405,000 for the oxidant injection and recirculation and $24, 547,000 for the operation and maintenance of this alternative for 30 years. The total cost of this alternative is $43, 952,000. Please refer to Appendix III for an explanation of the costs. This alternative will meet the required RCRA substantive requirements noted in the Director's Findings and Orders for Integration, Section VI, Paragraph 2, when the RAO's are met for groundwater. The alternative will be evaluated in five years from the date of remedy implementation to determine its effectiveness. For this remedy to be effective, groundwater data in the western portion of the plume must indicate that the source (nonaqueous/nondisolved contaminants) have been removed in a reasonable time frame. This alternative may be modified as needed to ensure that the cleanup objectives for the SWMU will be met.

8. CONCURRENCE

U.S. EPA has provided Ohio EPA with concurrence for all of the selected alternatives for the X-701B SWMU outlined above.

APPENDIX I
FIGURES

Figure 1

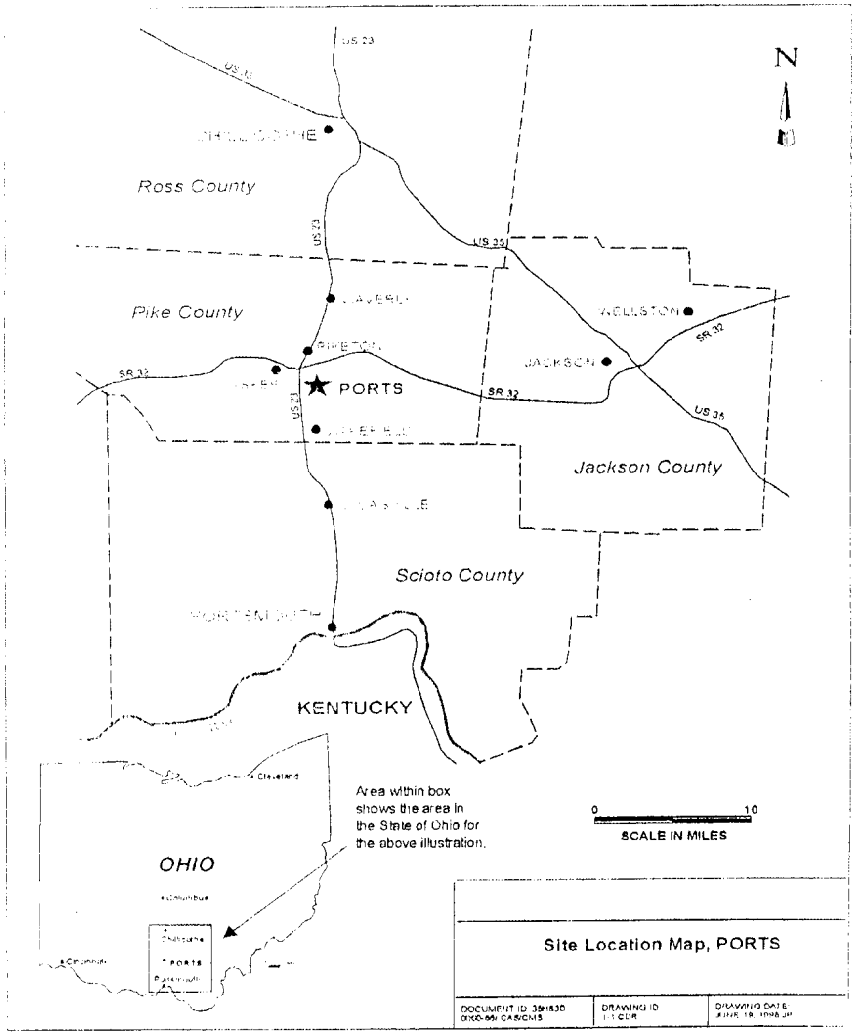

N
US 23
US 35
Ross County
Pike County
Jackson County
Scioto County
KENTUCKY
OHIO
PORTS
SR 32
US 52
Area within box shows the area in the State of Ohio for the above illustration.
0
10
SCALE IN MILES
Site Location Map, PORTS

Figure 2

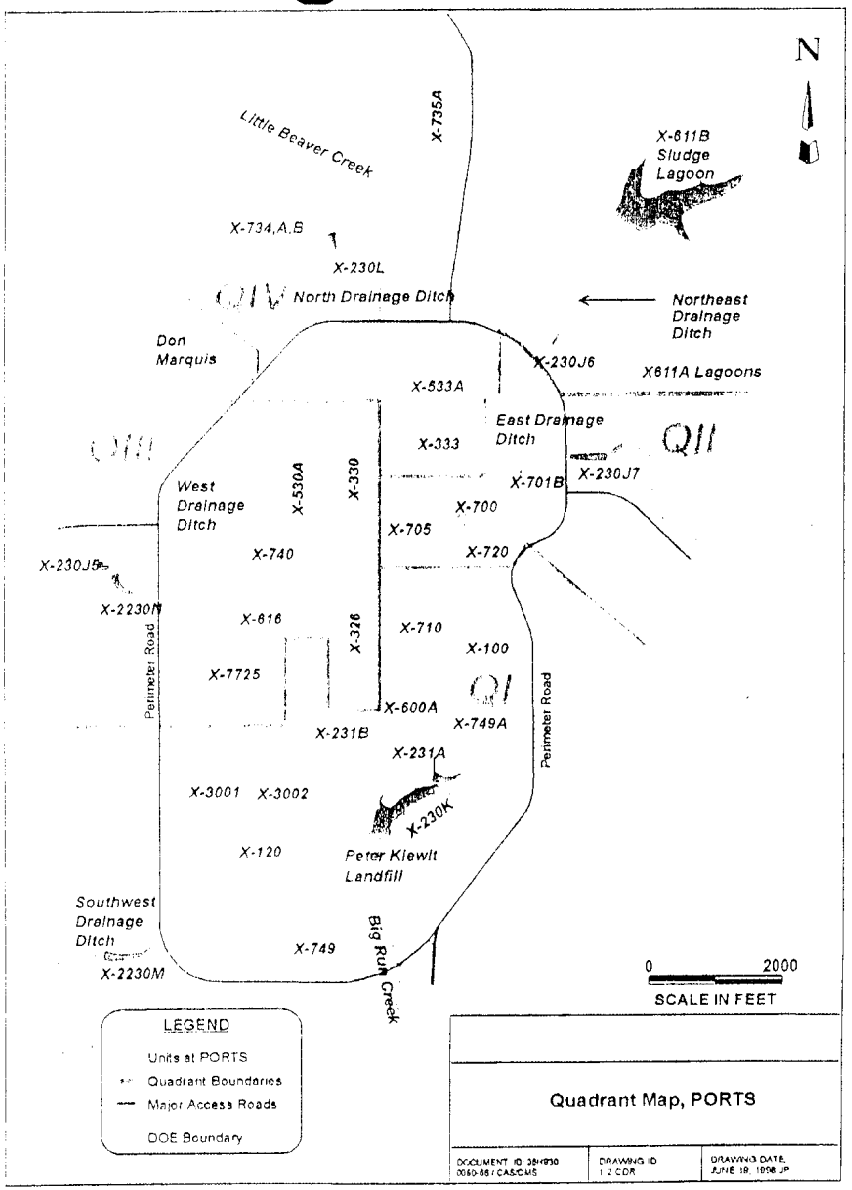

N
Little Beaver Creek
X-735A
X-611B Sludge Lagoon
X-734,A,B
X-230L
North Drainage Ditch
Northeast Drainage Ditch
Don Marquis
X-230J6
X611A Lagoons
X-533A
East Drainage Ditch
X-333
QII
West Drainage Ditch
X-530A
X-330
X-701B
X-230J7
X-700
X-705
X-740
X-720
X-230J5
X-2230N
X-616
X-326
X-710
X-100
Perimeter Road
X-7725
QI
X-600A
X-749A
X-231B
X-231A
X-3001
X-3002
X-230K
X-120
Peter Kiewit Landfill
Southwest Drainage Ditch
X-2230M
X-749
Big Run Creek
0
2000
SCALE IN FEET
LEGEND
Units at PORTS
Quadrant Boundaries
Major Access Roads
DOE Boundary
Quadrant Map, PORTS

Figure 3

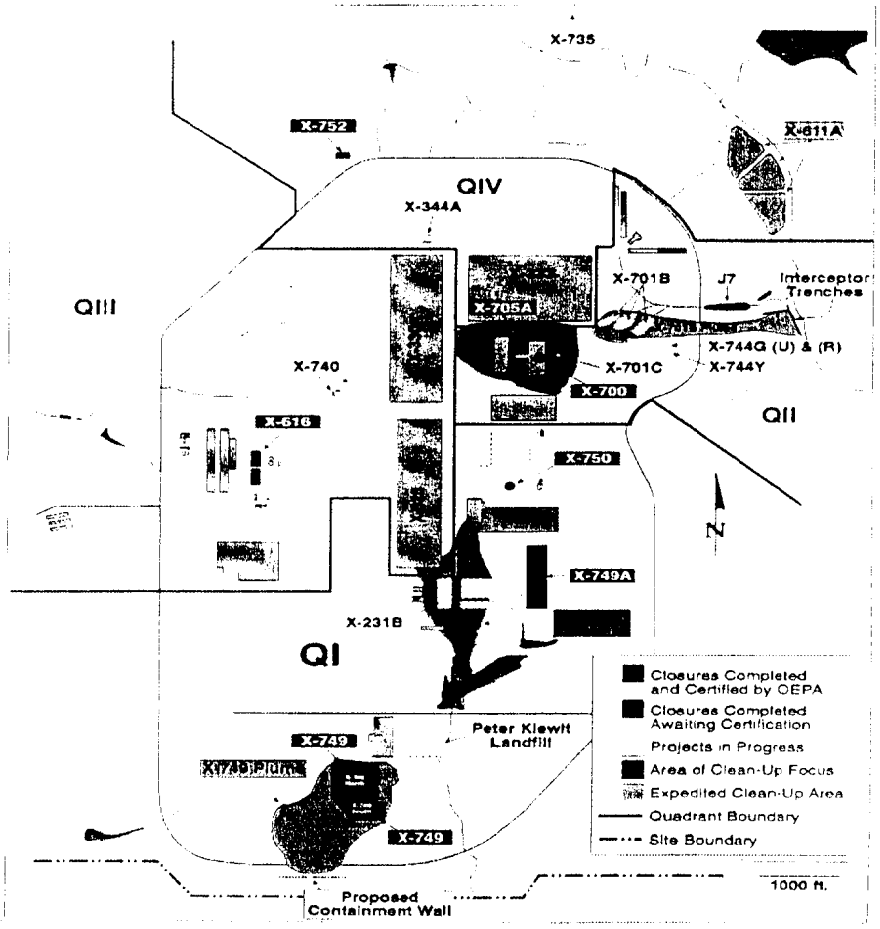

X-735
X-752
X-611A
QIV
X-344A
X-701B
J7
Interceptor Trenches
X-705A
QIII
X-744G (U) & (R)
X-744Y
X-740
X-701C
X-700
X-616
QII
X-750
N
X-749A
X-231B
QI
Peter Kiewit Landfill
X-749
X-749 Plume
X-749
Proposed Containment Wall
1000 ft.
Closures Completed and Certified by OEPA
Closures Completed Awaiting Certification
Projects in Progress
Area of Clean-Up Focus
Expedited Clean-Up Area
Quadrant Boundary
Site Boundary

Figure 4

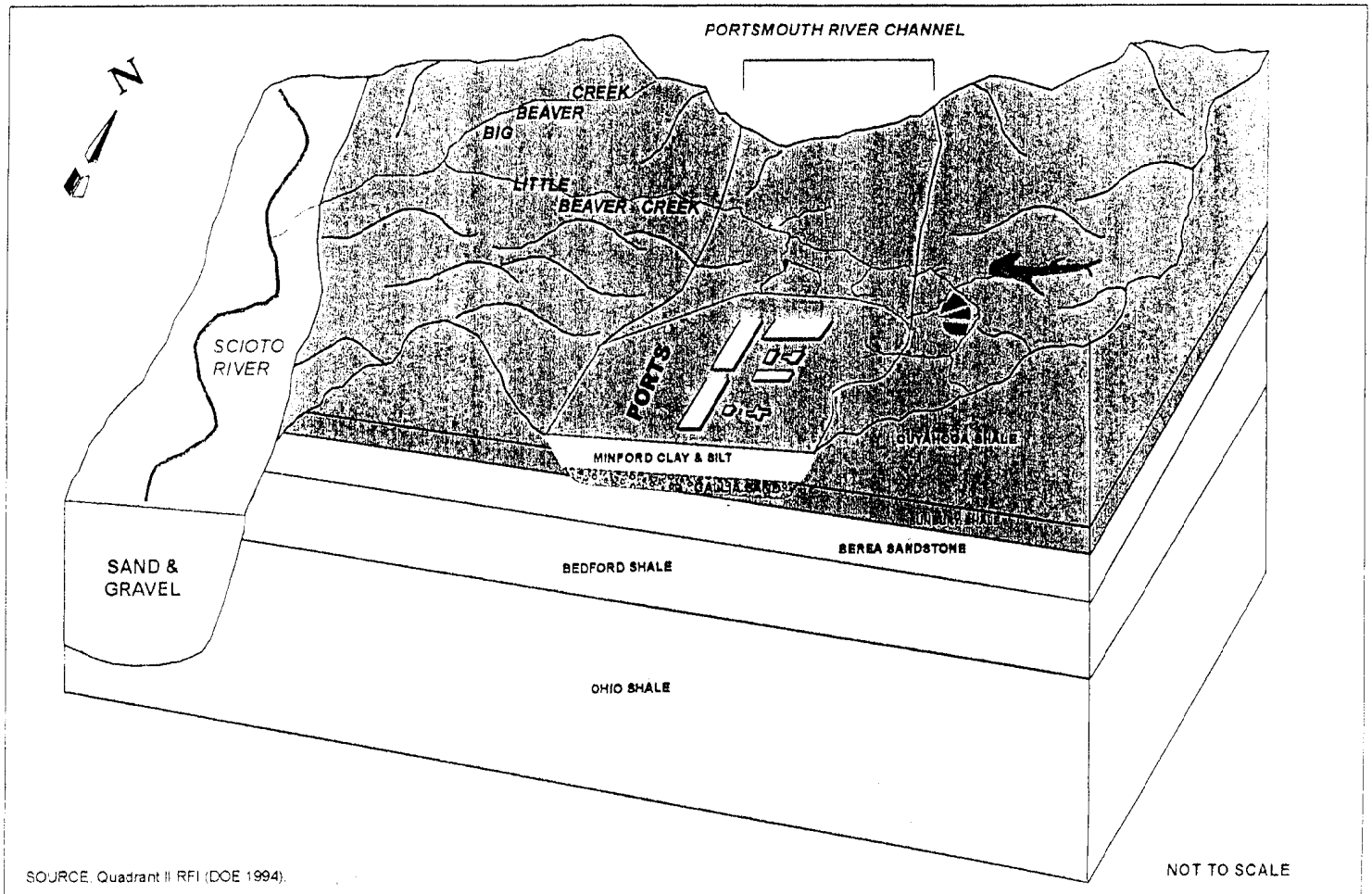
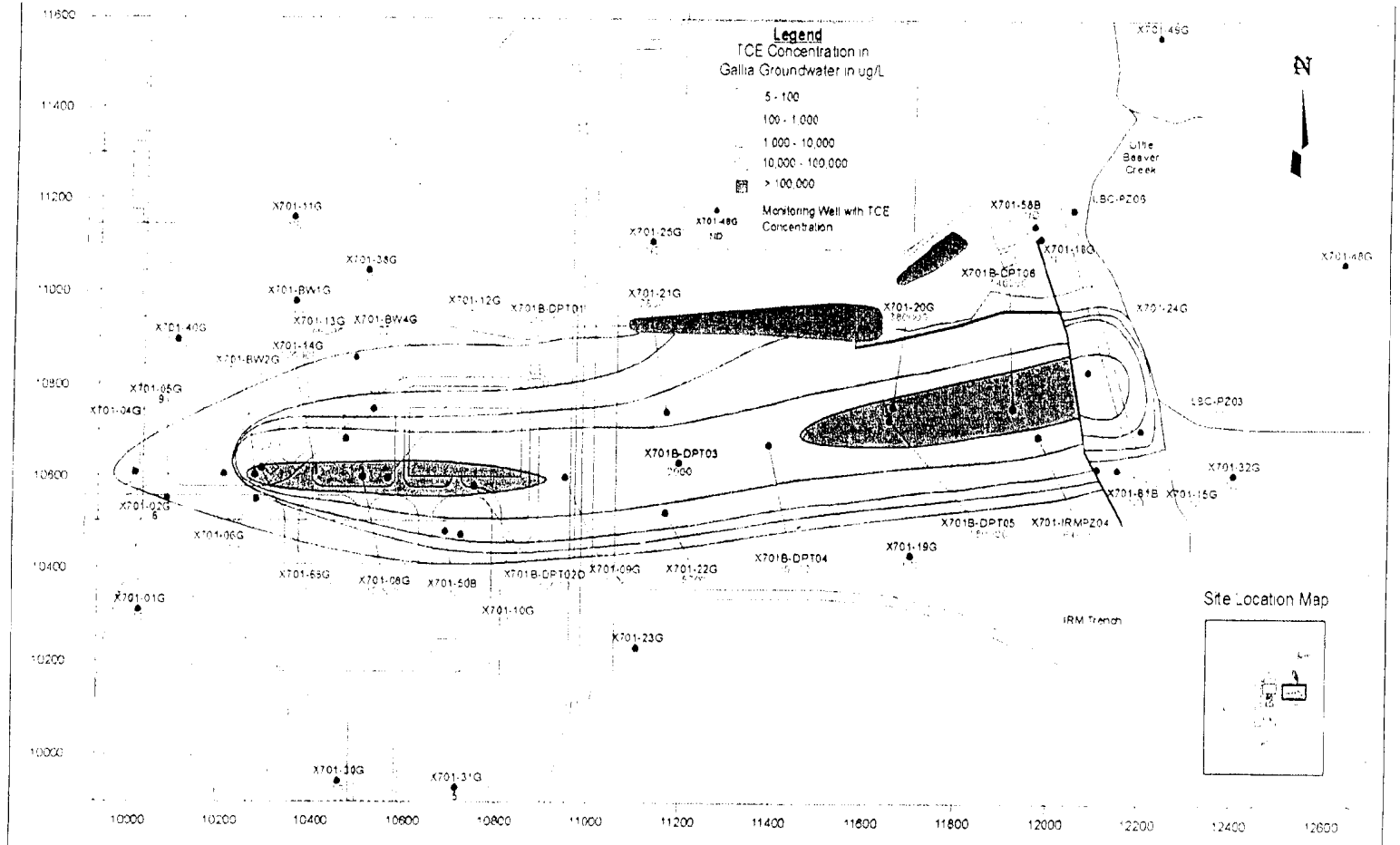

PORTSMOUTH RIVER CHANNEL
N
BIG BEAVER CREEK
LITTLE BEAVER CREEK
SCIOTO RIVER
PORTS
MINFORD CLAY & SILT
CUYAHOGA SHALE
BEREA SANDSTONE
BEDFORD SHALE
SAND & GRAVEL
OHIO SHALE
SOURCE: Quadrant II RFI (DOE 1994).
NOT TO SCALE
Schematic Block Diagram Showing Geology at PORTS
DOCUMENT ID: 35H830 0060-66 / CAS/CMS
DRAWING ID: 1-8.CDR
DRAWING DATE: JUNE 19 1998 JP
Portsmouth Gaseous Diffusion Plant

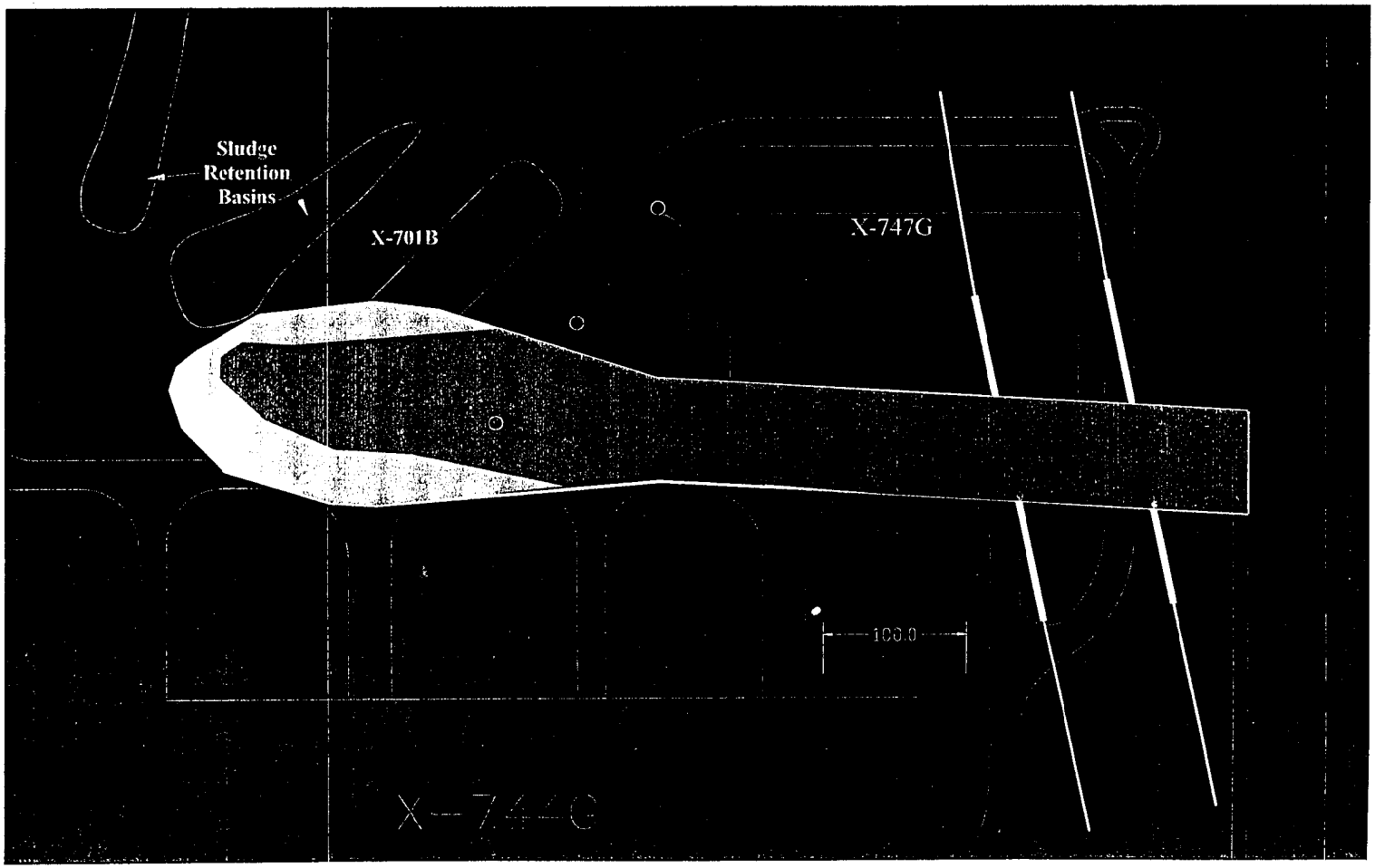
Figure 5

Figure 6



	X-701B Groundwater Investigative Area Plume - 1998 Map	DOCUMENT ID: 35L850 0060-70/CAS/CMS	DRAWING ID: 2_8b.CDR	DRAWING DATE: July 28, 2000 JR

Figure 8



APPENDIX II
ARARs

CAT	CRC	OAC	PARA	STATUS	CAPTION	TEXT	CAPTION
ODNR	1518.02			APP	ENDANGERED PLANT SPECIES	PROHIBITS REMOVAL OR DESTRUCTION OF ENDANGERED PLANT SPECIES (SOME PRIVATE PROPERTY EXCEPTIONS).	APPLIES TO REMEDIATION SITES WHERE CHEMICALS MAY HARM ENDANGERED SPECIES. CLEARLY ESTABLISHES THAT RECEPTOR PLANT SPECIES MUST BE CONSIDERED IN RISK ASSESSMENTS. THIS ACT MAY REQUIRE CONSIDERATION OF ENDANGERED SPECIES IN REMEDIATIONS.
APC	3704.05		A-I	APP	PROHIBITS VIOLATION OF AIR POLLUTION CONTROL RULES	PROHIBITS EMISSION OF AN AIR CONTAMINANT IN VIOLATION SEC. 3704 OR ANY RULES, PERMIT, ORDER OR VARIANCE ISSUED PURSUANT TO THAT SECTION OF THE ORC.	MAY PERTAIN TO ANY SITE WHERE EMISSIONS OF AN AIR CONTAMINANT OCCURS EITHER AS A PRE-EXISTING CONDITION OF THE SITE OR AS A RESULT OF REMEDIAL ACTIVITIES. SHOULD BE CONSIDERED FOR VIRTUALLY ALL SITES. QUIRE THE MANAGEMENT OF SOLID/HAZARD
HW APC	3734.02		(I)	APP	AIR EMISSIONS FROM HAZARDOUS WASTE FACILITIES	NO HAZARDOUS WASTE FACILITY SHALL EMIT ANY PARTICULATE MATTER, DUST, FUMES, GAS, MIST, SMOKE, VAPOR OR ODOROUS SUBSTANCE THAT INTERFERES WITH THE COMFORTABLE ENJOYMENT OF LIFE OR PROPERTY OR IS INJURIOUS TO PUBLIC HEALTH.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE MANAGED SUCH THAT AIR EMISSIONS MAY OCCUR. CONSIDER FOR SITES THAT WILL UNDERGO MOVEMENT OF EARTH OR INCINERATION.
HW	3734.02		(G)	REL	EXEMPTIONS TO SOLID & HAZ. WASTE T/S/D REQUIREMENTS	PROVIDES AUTHORITY AND CONDITIONS BY WHICH THE DIRECTOR MAY EXEMPT ANY PERSON FROM PERMITTING OR OTHER REQUIREMENTS GOVERNING THE GENERATION, STORAGE, TREATMENT, TRANSPORT OR DISPOSAL OF SOLID OR HAZARDOUS WASTE.	PERTAINS TO ANY SITE AT WHICH SOLID OR HAZARDOUS WASTE HAS COME TO BE LOCATED. CERTAIN ALTERNATIVES INCLUDE EXCAVATION ACTIVITIES WHICH MAY UNCOVER SOLID AND/OR HAZARDOUS WASTE. SHOULD THOSE ACTIVITIES REQUIRE THE MANAGEMENT OF SOLID/HA
HW	3734.02		(H)	APP	DIGGING" WHERE HAZ OR SOLID WASTE FACILITY WAS LOCATED	FILLING, GRADING, EXCAVATING, BUILDING, DRILLING OR MINING ON LAND WHERE HAZARDOUS WASTE OR SOLID WASTE FACILITY WAS OPERATED IS PROHIBITED WITHOUT PRIOR AUTHORIZATION FROM THE DIRECTOR OF THE OHIO EPA.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS OR SOLID WASTE HAS COME TO BE LOCATED. CERTAIN ALTERNATIVES INCLUDE EXCAVATION ACTIVITIES WHICH MAY UNCOVER SOLID AND/OR HAZARDOUS WASTE. SHOULD THOSE ACTIVITIES REQUIRE THE MANAGEMENT OF SOLID/HA
SW	3734.03			APP	PROHIBITS OPEN DUMPING OR BURNING	PROHIBITS OPEN BURNING OR OPEN DUMPING OF SOLID WASTE OR TREATED OR UNTREATED INFECTIOUS WASTE.	PERTAINS TO ANY SITE AT WHICH SOLID WASTE HAS COME TO BE LOCATED OR WILL BE GENERATED DURING A REMEDIAL ACTION.
APC DSW	3767.13			APP	PROHIBITION OF NUISANCES	PROHIBITS NOXIOUS EXHALATIONS OR SMELLS AND THE OBSTRUCTION OF WATERWAYS.	PERTAINS TO ANY SITE THAT MAY HAVE NOXIOUS SMELLS OR MAY OBSTRUCT WATERWAYS.
DSW	3767.14			APP	PROHIBITION OF NUISANCES	PROHIBITION AGAINST THROWING REFUSE, OIL, OR FILTH INTO LAKES, STREAMS, OR DRAINS.	PERTAINS TO ALL SITES LOCATED ADJACENT TO LAKES STREAMS, OR DRAINS.
DSW	6111.04			APP	ACTS OF POLLUTION PROHIBITED	POLLUTION OF WATERS OF THE STATE IS PROHIBITED.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED ON-SITE GROUND OR SURFACE WATER OR WILL HAVE A DISCHARGE TO ON-SITE SURFACE OR GROUND WATER.
DSW	6111.07		A,C	APP	WATER POLLUTION CONTROL REQUIREMENTS - DUTY TO COMPLY	PROHIBITS FAILURE TO COMPLY WITH REQUIREMENTS OF SECTIONS 6111.01 TO 6111.08 OR ANY RULES, PERMIT OR ORDER ISSUED UNDER THOSE SECTIONS.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND WATER OR SURFACE WATER OR WILL HAVE A DISCHARGE TO ON-SITE SURFACE OR GROUND WATER.

HW	3734.02.7		A,B	REL	HANDLING LOW-LEVEL RADIOACTIVE WASTE PROHIBITED	A) PROHIBITS COMMINGLING LOW LEVEL RADIOACTIVE WASTE WITH ANY TYPE OF SOLID WASTE, HAZARDOUS WASTE, OR INFECTIOUS WASTE. B) NO OWNER OR OPERATOR OF A SOLID, INFECTIOUS OR HAZARDOUS WASTE FACILITY SHALL ACCEPT FOR TRANSFER, STORAGE, TRE	PERTAINS TO ALL SITES AT WHICH LOW LEVEL RADIOACTIVE WASTE HAS COME TO BE LOCATED.
DSW	6111.04.2			APP	RULES REQUIRING COMPLIANCE WITH NATIONAL EFFLUENT STDS	ESTABLISHES REGULATIONS REQUIRING COMPLIANCE WITH NATIONAL EFFLUENT STANDARDS.	PERTAINS TO ANY SITE WHICH WILL HAVE A POINT SOURCE DISCHARGE.
UIC	6111.04.3			APP	INJECTION OF SEWAGE OR WASTES INTO WELLS	ESTABLISHES A REGULATORY PROGRAM FOR THE INJECTION OF WASTES INTO WELLS THAT PREVENTS THE CONTAMINATION OF UNDERGROUND SOURCES OF DRINKING WATER.	PERTAINS TO ANY SITE THAT EITHER HAS OR INTENDS TO INJECT WASTES OF ANY TYPE INTO WELLS.
ODNR		1501:31-23-	01, A-B	TBC	LIST OF ENDANGERED ANIMAL SPECIES	LIST OF OHIO ANIMAL SPECIES CONSIDERED ENDANGERED.	MAY APPLY TO REMEDIATION SITES WHERE LISTED SPECIES ARE THREATENED BY CHEMICAL RELEASES. MAY ALSO APPLY AT SITES WHERE REMEDIAL ACTIVITIES COULD DISTURB EXISTING HABITATS.
ODNR		1501-18-1	03, A	TBC	LIST OF ENDANGERED PLANT SPECIES	PLANT SPECIES CONSIDERED ENDANGERED IN OHIO	MAY APPLY AT REMEDIATION SITES WHERE CHEMICAL RELEASE THREATENS LISTED SPECIES. SHOULD ALSO BE CONSIDERED WHERE REMEDIAL ACTIVITIES MAY DISRUPT HABITATS.
DSW		3745-1-03		APP	ANALYTICAL AND COLLECTION PROCEDURES	SPECIFIES ANALYTICAL METHODS AND COLLECTION PROCEDURES FOR SURFACE WATER DISCHARGES.	PERTAINS TO BOTH DISCHARGES TO SURFACE WATERS AS A RESULT OF REMEDIATION AND ANY ON-SITE SURFACE WATERS AFFECTED BY SITE CONDITIONS.
DSW		3745-1-04	A, B,C,D,E	APP	THE "FIVE FREEDOMS" FOR SURFACE WATER	ALL SURFACE WATERS OF THE STATE SHALL BE FREE FROM: A) OBJECTIONABLE SUSPENDED SOLIDS. B)FLOATING DEBRIS, OIL AND SCUM. C) MATERIALS THAT CREATE A NUISANCE. D) TOXIC, HARMFUL OR LETHAL SUBSTANCES. E) NUTRIENTS THAT CREATE NUISANCE GROWTH	PERTAINS TO BOTH DISCHARGES TO SURFACE WATERS AS A RESULT OF REMEDIATION AND ANY ON-SITE SURFACE WATERS AFFECTED BY SITE CONDITIONS.
DSW		3745-1-05	A-C	APP	ANTIDEGRADATION POLICY FOR SURFACE WATER	PREVENTS DEGRADATION OF SURFACE WATER QUALITY BELOW DESIGNATED USE OR EXISTING WATER QUALITY. EXISTING IN STREAM USES SHALL BE MAINTAINED AND PROTECTED. THE MOST STRINGENT CONTROLS FOR TREATMENT SHALL BE REQUIRED BY THE DIRECTOR TO BE	REQUIRES THAT BEST AVAILABLE TECHNOLOGY (BAT) BE USED TO TREAT SURFACE WATER DISCHARGES. DWCPA USES THIS RULE TO SET STANDARDS WHEN EXISTING WATER QUALITY IS BETTER THAN THE DESIGNATED USE.
DSW		3745-1-06	A,B	APP	MIXING ZONES FOR SURFACE WATER	(A) PRESENTS THE CRITERIA FOR ESTABLISHING NON-THERMAL MIXING ZONES FOR POINT SOURCE DISCHARGES (B) PRESENTS THE CRITERIA FOR ESTABLISHING THERMAL MIXING ZONES FOR POINT SOURCE DISCHARGES	APPLIED AS A TERM OF DISCHARGE PERMIT TO INSTALL (PTI). WOULD PERTAIN TO AN ALTERNATIVE WHICH RESULTED IN A POINT SOURCE DISCHARGE
DSW		3745-1-07	C	APP	WATER QUALITY CRITERIA	ESTABLISHES WATER QUALITY CRITERIA FOR POLLUTANTS WHICH DO NOT HAVE SPECIFIC NUMERICAL OR NARRATIVE CRITERIA IDENTIFIED IN TABLES 7-1 THROUGH 7-15 OF THIS RULE.	PERTAINS TO BOTH DISCHARGES TO SURFACE WATERS AS A RESULT OF REMEDIAL ACTION AND ANY SURFACE WATERS AFFECTED BY SITE CONDITIONS.

DSW	3745-1-09		APP	WATER USE DES FOR SCIOTO RIVER	ESTABLISHES WATER USE DESIGNATIONS FOR STREAM SEGMENTS WITHIN THE SCIOTO RIVER BASIN.	PERTINENT IF STREAM OR STREAM SEGMENT IS ON-SITE AND IS EITHER AFFECTED BY SITE CONDITIONS OF IF REMEDY INCLUDES DIRECT DISCHARGE. USED BY DWQPA TO ESTABLISH WASTE LOAD ALLOCATIONS.
DSW	3745-1-32		APP	WATER USE DES FOR OHIO RIVER	ESTABLISHES WATER USE DESIGNATIONS FOR STREAM SEGMENTS WITHIN THE OHIO RIVER BASIN.	PERTINENT IF STREAM OR STREAM SEGMENT IS ON-SITE AND IS EITHER AFFECTED BY SITE CONDITIONS OF IF REMEDY INCLUDES DIRECT DISCHARGE. USED BY DWQPA TO ESTABLISH WASTE LOAD ALLOCATIONS.
DSW	3745-1-34	A-D	APP	WATER QUALITY CRITERIA FOR THE OHIO RIVER DRAINAGE BASIN	APPLIES TO DISCHARGES TO STREAMS WITHIN THE OHIO RIVER BASIN, USED BY DSW TO DETERMINE DISCHARGE LIMITS	CONSIDER FOR SITES WITH DISCHARGES TO OHIO RIVER BASIN
DSW	3745-1-35	A-G	APP	SITE-SPECIFIC MODIFICATIONS TO CRITERIA AND VALUES	DESCRIBES STANDARDS BY WHICH AGENCY MAY MAKE SITE SPECIFIC ADJUSTMENTS TO DETERMINE WATER QUALITY STANDARDS AND DISCHARGE LIMITS. CONSIDERS LOCAL CONDITIONS SUCH AS WATER CHEMISTRY OR SENSITIVE SPECIES THAT MAY NECESSITATE MODIFICATION	CONSIDER FOR ANY SITE THAT W LL DISCHARGE TO SURFACE WATERS OF OHIO
DSW	3745-1-37	A-G	APP	METHODOLOGIES FOR DERIVING BIOACCUMULATION FACTORS	USED BY DSW IN PREDICTING HUMAN AND AQUATIC HEALTH EFFECTS OF POLLUTANTS. IMPACTS DISCHARGE LIMITS/	CONSIDER FOR SITES WITH SURFACE WATER DISCHARGES.
DSW	3745-1-40	A,B	APP	DEV. OF AQUATIC LIFE CRITERIA, OHIO RIVER BASIN	USED BY DSW TO CALCULATE CHEMICAL CONCENTRATIONS HARMFUL TO WILDLIFE IN CHIO RIVER BASIN. IMPACTS DISCHARGE STANDARDS.	CONSIDER FOR SITES WITH DISCHARGES IN OHIO RIVER BASIN
APC	3745-15-05	A-I	APP	DE MINIMIS EXEMPTION	GENERALLY EXEMPTS SOURCES WITH LESS THAN 10 LBS/DAY OR 2000LBS/YEAR OF EMISSIONS	CONSIDER FOR SITES WITH INCINERATION, AIR STRIPPING, SOIL VAPOR EXTRACTION OR OTHER POTENTIAL TO EMIT AIR POLLUTANTS
APC	3745-15-06	A1,A2	APP	MALFUNCTION & MAINTENANCE OF AIR POLL CONTROL EQUIPMENT	ESTABLISHES SCHEDULED MAINTENANCE AND SPECIFIES WHEN POLLUTION SOURCE MUST BE SHUT DOWN DURING MAINTENANCE	PERTAINS TO ANY SITE WHICH UTILIZES OR WILL UTILIZE AIR POLLUTION CONTROL EQUIPMENT ON-SITE.
APC	3745-15-07	A	APP	AIR POLLUTION NUISANCES PROHIBITED	DEFINES AIR POLLUTION NUISANCE AS THE EMISSION OR ESCAPE INTO THE AIR FROM ANY SOURCES(s)) OF SMOKE, ASHES, DUST, DIRT, GRIME, ACIDS, FUMES, GASES, VAPORS, ODORS AND COMBINATIONS OF THE ABOVE THAT ENDANGER HEALTH, SAFETY OR WELFARE OF T	PERTAINS TO ANY SITE WHICH CAUSES, OR MAY REASONABLY CAUSE, AIR POLLUTION NUISANCES. CONSIDER FOR SITES THAT WILL UNDERGO EXCAVATION, DEMOLITION, CAP INSTALLATION, METHANE PRODUCTION, CLEARING AND GRUBBING, WATER TREATMENT, INCINERATION
APC	3745-15-08	A	APP	CIRCUMVENTION	FORBIDS DILUTION OR OTHER MEANS TO CONCEAL EMISSIONS WITHOUT ACTUAL REDUCTIONS	CONSIDER FOR SITES WITH EMISSIONS TO AIR, AIR STRIPPING, INCINERATION, SOIL VAPOR EXTRACTION ETC
APC	3745-16-02	B,C	APP	STACK HEIGHT REQUIREMENTS	ESTABLISHES ALLOWABLE STACK HEIGHT FOR AIR CONTAMINANT SOURCES BASED ON GOOD ENGINEERING PRACTICE.	PERTAINS TO ANY SITE THAT HAS OR WILL HAVE AN AIR CONTAMINANT SOURCE ON-SITE (PARTICULATE, DUST, FUMES, GAS, MIST, SMOKE, VAPOR, ODORS) EMITTED FROM A STACK. CONSIDER FOR REMEDIES INCORPORATING INCINERATION, WASTE FUEL RECOVERY AND WAST

APC	3745-17-02	A,B,C	APP	PARTICULATE AMBIENT AIR QUALITY STANDARDS	ESTABLISHES SPECIFIC STANDARDS FOR TOTAL SUSPENDED PARTICULATES.	PERTAINS TO ANY SITE THAT MAY EMIT MEASURABLE QUANTITIES OF PARTICULATE MATTER (BOTH STACK AND FUGITIVE). CONSIDER FOR SITES THAT WILL UNDERGO EXCAVATION, DEMOLITION, CAP INSTALLATION, CLEARING AND GRUBBING, INCINERATION AND WASTE FUEL
APC	3745-17-05		APP	PARTICULATE NON-DEGRADATION POLICY	DEGRADATION OF AIR QUALITY IN ANY AREA WHERE AIR QUALITY IS BETTER THAN REQUIRED BY 3745-17-02 IS PROHIBITED	PERTAINS TO SITES IN CERTAIN LOCATIONS THAT MAY EMIT OR ALLOW THE ESCAPE OF PARTICULATES (BOTH STACK AND FUGITIVE). CONSIDER FOR SITES THAT WILL UNDERGO EXCAVATION, DEMOLITION, CAP INSTALLATION, CLEARING AND GRUBBING, INCINERATION.
APC	3745-17-08	A1,A2,B,D	APP	EMISSION RESTRICTIONS FOR FUGITIVE DUST	ALL EMISSIONS OF FUGITIVE DUST SHALL BE CONTROLLED.	PERTAINS TO SITES WHICH MAY HAVE FUGITIVE EMISSIONS (NON-STACK) OF DUST. CONSIDER FOR SITES THAT WILL UNDERGO GRADING, LOADING OPERATIONS, DEMOLITION, CLEARING AND GRUBBING AND CONSTRUCTION UTILIZE INCINERATION OR FUEL RECOVERY (WASTE F
APC	3745-19-04	A,B,C,D	REL	OPEN BURNING STANDARDS IN UNRESTRICTED AREAS	OPEN BURNING WITHOUT PRIOR AUTHORIZATION FROM OHIO EPA IS PROHIBITED	PERTAINS TO SITES WITHIN AN UNRESTRICTED AREA (OUTSIDE THE BOUNDARY OF A MUNICIPALITY AND A ZONE EXTENDING BEYOND SUCH MUNICIPALITY).
DSW	3745-2-04	A-G	APP	DEVELOPMENT OF WATER QUALITY BASED EFFLUENT LIMITATIONS	USED BY DSW TO DETERMINE WASTE LOAD ALLOCATIONS FOR DISCHARGES TO SURFACE WATER. IMPACTS DISCHARGE LIMITS.	CONSIDER FOR ANY SITE WITH DISCHARGE TO SURFACE WATERS
DSW	3745-2-05	A,B	APP	CALCULATING WASTELOAD ALLOCATIONS	PROCESS FOR CALCULATING WASTELOAD ALLOCATIONS FOR DISCHARGES.	CONSIDER FOR SITES WITH SURFACE WATER DISCHARGES
DSW	3745-2-06	A-D	APP	APPLICATION OF PRELIMINARY EFFLUENT LIMITATIONS	METHODOLOGY FOR CALCULATING DISCHARGE LIMITATIONS BASED ON CHEMICAL AND BIOLOGICAL FACTORS.	CONSIDER FOR SITES WITH DISCHARGES TO SURFACE WATERS.
DSW	3745-2-07	A,B	APP	ADDITIVE EFFECTS OF POLLUTANTS	DESCRIBES PROCESS FOR CALCULATING COMBINED EFFECTS OF MULTIPLE WATER CONTAMINANTS. USED TO CALCULATE DISCHARGE LIMITS.	CONSIDER FOR SITES WITH SURFACE WATER DISCHARGES.
DSW	3745-2-08	A-L	APP	MIXING ZONE DEMONSTRATION AND SIZING REQUIREMENTS	METHODS FOR DETERMINING EFFECTS OF MIXING ZONES. USED IN CALCULATING DISCHARGE LIMITS.	CONSIDER FOR SITES WITH SURFACE WATER DISCHARGES.
DSW	3745-2-09	A-F	APP	WHOLE EFFLUENT TOXICITY AND WATER QUALITY BASED LIMITS	METHODS FOR CALCULATING TOXICITY BASED CONSIDERATIONS FOR DISCHARGE LIMITS.	CONSIDER FOR SITES WITH SURFACE WATER DISCHARGES.
DSW	3745-2-11	A-F	APP	DISSOLVED OXYGEN MODELING	METHODS FOR CALCULATING EFFECTS OF DISCHARGE ON DISSOLVED OXYGEN.	CONSIDER FOR SITES WITH SURFACE WATER DISCHARGES.
DSW	3745-2-12	A-O	APP	TOTAL MAXIMUM DAILY LOADS	FURTHER METHODOLOGY FOR CALCULATING DISCHARGES. INCLUDES EFFECTS OF NONPOINT SOURCES.	CONSIDER FOR SITES WITH SURFACE WATER DISCHARGES.
HW	3745-248-01	A-E	APP	APPLICABILITY OF RULES 3745-218-01 TO 3745-218-02	DEFINES CONTAINMENT BUILDING	CONSIDER FOR SITES WITH BUILDINGS FOR TREATMENT, STORAGE OR DISPOSAL
HW	3745-248-02	A,B	REL	CLOSURE AND POST-CLOSURE CARE OF CONTAINMENT BUILDINGS.	STANDARDS FOR CONTAINMENT BUILDING CLOSURE.	CONSIDER FOR SITES WITH BUILDINGS FOR TREATMENT, STORAGE OR DISPOSAL

HW	3745-248-11	A-E	REL	DESIGN AND OPERATING STANDARDS FOR CONTAINMENT BUILDING	STANDARDS FOR DESIGN AND OPERATION OF CONTAINMENT BUILDINGS	CONSIDER FOR SITES WITH BUILDINGS FOR TREATMENT, STORAGE OR DISPOSAL
HW	3745-270-01	A-F	APP	PURPOSE, SCOPE, AND APPLICABILITY OF 3745-270	GIVES APPLICABILITY OF LAND DISPOSAL RESTRICTIONS	CONSIDER FOR REMEDIAL OPTIONS INCLUDING LAND DISPOSAL OR LEAVING WASTES IN-PLACE
HW	3745-270-02	A,B	APP	DEFINITIONS IN 3745-270	DEFINITIONS APPLICABLE TO LAND DISPOSAL RESTRICTIONS	CONSIDER FOR REMEDIAL OPTIONS INCLUDING LAND DISPOSAL OR LEAVING WASTES IN-PLACE
HW	3745-270-03	A-D	APP	DILUTION PROHIBITED AS A SUBSTITUTE FOR TREATMENT	FORBIDS DILUTION AS A MEANS OF ACHIEVING LAND DISPOSAL RESTRICTION LEVELS	CONSIDER FOR REMEDIAL OPTIONS INCLUDING LAND DISPOSAL OR LEAVING WASTES IN-PLACE
HW	3745-270-48	A	APP	UNIVERSAL TREATMENT STANDARDS	GIVES CONTAMINANT CHEMICAL SPECIFIC STANDARDS FOR LAND DISPOSAL	CONSIDER FOR SITES WITH WASTE GENERATION OR ON-SITE DISPOSAL
HW	3745-270-49	A-E	APP	LAND DISPOSAL RESTRICTION FOR CONTAMINATED SOILS	SPECIFIES STANDARDS FOR SOIL TREATMENT	CONSIDER AT SITES WHERE CONTAMINATED SOILS ARE GENERATED
DSIWM	3745-27-08	C,D-H	REL	CONSTRUCTION SPECIFICATIONS FOR SANITARY LANDFILLS	SPECIFIES THE MINIMUM REQUIREMENTS FOR THE SOIL/CLAY LAYERS, GRANULAR DRAINAGE LAYER, GEOSYNTHETICS, LEACHATE MANAGEMENT SYSTEM, GAS MONITORING SYSTEM, ETC. ALSO ESTABLISHES CONSTRUCTION REQUIREMENTS FOR FACILITIES TO BE LOCATED IN GEO	PERTAINS TO ANY NEW SOLID WASTE DISPOSAL FACILITY CREATED ON-SITE AND ANY EXPANSIONS TO EXISTING SOLID WASTE LANDFILLS. PORTIONS ALSO PERTAIN TO AREAS OF CONTAMINATION THAT ARE CAPPED PER SOLID WASTE RULES. MAY SERVE AS SITING CRITERIA
DSIWM	3745-27-13	C	REL	DISTURBANCES WHERE HAZ OR SOLID WASTE FAC WAS OPERATED	REQUIRES THAT A DETAILED PLAN BE PROVIDED TO DESCRIBE HOW ANY PROPOSED FILLING, GRADING, EXCAVATING, BUILDING, DRILLING OR MINING ON LAND WHERE A HAZARDOUS WASTE FACILITY OR SOLID WASTE FACILITY WAS OPERATED WILL BE ACCOMPLISHED. THIS	PERTAINS TO ANY SITE AT WHICH HAZARDOUS OR SOLID WASTE HAS BEEN MANAGED, EITHER INTENTIONALLY OR OTHERWISE. DOES NOT PERTAIN TO AREAS THAT HAVE HAD ONE-TIME LEAKS OR SPILLS.
DSIWM	3745-27-14	A	TBC	POST-CLOSURE CARE OF SANITARY LANDFILL FACILITIES	SPECIFIES THE REQUIRED POST-CLOSURE CARE FOR SOLID WASTE FACILITIES. INCLUDES CONTINUING OPERATION OF LEACHATE AND SURFACE WATER MANAGEMENT SYSTEMS, MAINTENANCE OF THE CAP SYSTEM AND GROUND WATER MONITORING.	SUBSTANTIVE REQUIREMENTS PERTAIN TO ANY NEWLY CREATED SOLID WASTE LANDFILLS ON-SITE, ANY EXPANSIONS OF EXISTING SOLID WASTE LANDFILLS ON-SITE AND ANY EXISTING AREAS OF CONTAMINATION THAT ARE CAPPED PER THE SOLID WASTE RULES.
DSIWM	3745-27-19	J	REL	SANITARY LANDFILL OPERATIONS - SURFACE WATER MGMNT.	SURFACE WATER MUST BE DIVERTED FROM AREAS WHERE SOLID WASTE IS BEING, OR HAS BEEN, DEPOSITED. ALSO REQUIRES RUN-ON AND RUN-OFF TO BE CONTROLLED TO MINIMIZE INFILTRATION THROUGH THE COVER MATERIALS AND TO MINIMIZE EROSION OF THE CAP SYSTEM.	PERTAINS TO NEW SOLID WASTE DISPOSAL FACILITIES TO BE CREATED ON-SITE AND EXISTING LANDFILLS THAT WILL BE EXPANDED DURING REMEDIATION. PORTIONS ALSO MAY PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT WILL BE CAPPED IN-PLACE PER SOLID WA
DSIWM	3745-27-19	K	TBC	SANITARY LANDFILL OPERATIONS - LEACHATE MANAGEMENT	REQUIRES REPAIR OF LEACHATE OUTBREAKS; COLLECTION AND TREATMENT OF LEACHATE ON THE SURFACE OF THE LANDFILL; AND ACTIONS TO MINIMIZE, CONTROL OR ELIMINATE CONDITIONS CAUSING LEACHATE OUTBREAKS.	PERTAINS TO NEW SOLID WASTE DISPOSAL FACILITIES TO BE CREATED ON-SITE AND EXISTING LANDFILLS THAT WILL BE EXPANDED DURING REMEDIATION. PORTIONS ALSO MAY PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT WILL BE CAPPED IN-PLACE PER SOLID WA
UIC	3745-34-06		APP	PROHIBITION OF UNAUTHORIZED INJECTION	UNDERGROUND INJECTION IS PROHIBITED WITHOUT AUTHORIZATION FROM THE DIRECTOR.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.

UIC	3745-34-07		APP	NO MOVEMENT OF FLUID INTO UNDERGROUND DRINKING WATER	THE UNDERGROUND INJECTION OF FLUID CONTAINING ANY CONTAMINANT INTO AN UNDERGROUND SOURCE OF DRINKING WATER IS PROHIBITED IF THE PRESENCE OF THAT CONTAMINANT MAY CAUSE A VIOLATION OF THE PRIMARY DRINKING WATER STANDARDS OR OTHER WISE ADVE	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING
UIC	3745-34-08		APP	ELIMINATION OF CLASS IV WELLS	THE INJECTION OF HAZARDOUS OR RADIOACTIVE WASTE DIRECTLY INTO AN UNDERGROUND SOURCE OF DRINKING WATER IS PROHIBITED.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC	3745-34-09		APP	REQUIREMENTS FOR WELLS INJECTING HAZARDOUS WASTE	SPECIFIES REQUIREMENTS FOR THE INJECTION OF HAZARDOUS WASTES UNDERGROUND. SEE 3745-34-08 FOR LIMITATIONS.6 OF THE ORC.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC	3745-34-10		APP	WAIVER OF REQUIREMENT BY DIRECTOR	THE DIRECTOR MAY AUTHORIZE LESS STRINGENT REQUIREMENTS FOR AN INJECTION THAT DOES NOT OCCUR INTO, THROUGH OR ABOVE AN UNDERGROUND SOURCE OF DRINKING WATER.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC	3745-34-13		APP	CLASS V WELLS	SPECIFIES REQUIREMENTS FOR CLASS V WELLS. SEE 3745-34-04 FOR DEFINITIONS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC	3745-34-26		APP	CONDITIONS APPLICABLE TO ALL PERMITS	SPECIFIES MINIMUM CONDITIONS TO BE APPLIED TO ALL UNDERGROUND INJECTIONS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC	3745-34-34		APP	MECHANICAL INTEGRITY	SPECIFIES REQUIREMENTS TO BE MET TO ENSURE MECHANICAL INTEGRITY OF WELLS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC	3745-34-36		APP	PLUGG NG AND ABANDONING CLASS I WELLS	SPECIFIES REQUIREMENTS TO BE MET WHEN PLUGGING OR ABANDONING A CLASS I WELL. SEE 3745-34-04 FOR DEFINITIONS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC	3745-34-37		APP	CONSTRUCTION REQUIREMENTS FOR CLASS I WELLS	SPECIFIES CONSTRUCTION AND SITING REQUIREMENTS FOR CLASS I WELLS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
UIC	3745-34-38		TBC	OPERATING, MONITORING & REPORTING REQ FOR CLASS I WELLS	SPECIFIES OPERATING, MONITORING AND REPORTING REQUIREMENTS NECESSARY FOR CLASS I WELLS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.
HW	3745-50-44	C1	APP	ADD'L PERMIT INFO: HAZ WASTE STORAGE IN CONTAINERS	ESTABLISHES THE SUBSTANTIVE HAZARDOUS WASTE PERMIT REQUIREMENTS NECESSARY FOR OHIO EPA TO DETERMINE ADEQUACY OF CONTAINER STORAGE. INCLUDES INFORMATION SUCH AS DESCRIPTION OF CONTAINMENT SYSTEM, DETAILED DRAWINGS, ETC. SEE OAC 3745-55-	PERTAINS TO ANY SITE AT WHICH STORAGE OF HAZARDOUS WASTE ON-SITE WILL OCCUR IN CONTAINERS. CONSIDER FOR WASTES AND CONTAMINATED SOILS THAT ARE STORED PRIOR TO TREATMENT OR DISPOSAL. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS RULE AND OA

HW	3745-50-44	C2	APP	ADD'L PERMIT INFO: HAZ WASTE STORAGE/ TREAT IN TANKS	ESTABLISHES SUBSTANTIVE HAZARDOUS WASTE PERMIT REQUIREMENTS NECESSARY FOR OHIO EPA TO DETERMINE ADEQUACY OF TANK TREATMENT AND STORAGE UNITS. INCLUDES INFORMATION SUCH AS ASSESSMENT OF STRUCTURAL INTEGRITY, DETAILED PLANS OF TANK SYSTEM	PERTAINS TO ANY SITE AT WHICH STORAGE OR TREATMENT OF HAZARDOUS WASTE IN TANKS WILL OCCUR ON-SITE. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS RULE AND OAC 3745-55-90 THROUGH 3745-55-99, ESTABLISHES THE MINIMUM INFORMATION REQUIRED DURING
HW	3745-50-44	C4	APP	ADD'L PERMIT INFO: HAZ WASTE STOR/TREAT IN WASTE PILES	ESTABLISHES SUBSTANTIVE HAZARDOUS WASTE PERMIT REQUIREMENTS NECESSARY FOR OHIO EPA TO DETERMINE ADEQUACY OF WASTE PILES USED TO TREAT OR STORE HAZARDOUS WASTE. INCLUDES INFORMATION SUCH AS WASTE CHARACTERISTICS, DETAILED DESIGN PLANS AN	PERTAINS TO SITES AT WHICH HAZARDOUS WASTE WILL BE STORED OR TREATED IN WASTE PILES. CONSIDER FOR TEMPORARY STORAGE ALSO.
HW	3745-50-44	C8	APP	ADD'L PERMIT INFO: HAZ WASTE T/S/D IN MISC UNITS	ESTABLISHES SUBSTANTIVE HAZARDOUS WASTE PERMIT REQUIREMENTS NECESSARY FOR OHIO EPA TO DETERMINE ADEQUACY OF MISCELLANEOUS UNITS USED TO TREAT OR STORE HAZARDOUS WASTE. INCLUDES INFORMATION SUCH AS WASTE CHARACTERISTICS, DETAILED DESIGN	PERTAINS TO FACILITY/SITE AT WHICH HAZARDOUS WASTE WILL BE STORED, TREATED OR DISPOSED OF IN MISCELLANEOUS UNITS. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS RULE AND OAC 3745-57-90 THROUGH 3745-57-93, ESTABLISHES THE MINIMUM INFORMATION
HW	3745-50-44	C6	APP	ADD'L PERMIT INFO: ENVIRONMENTAL PERFORMANCE STANDARDS	ESTABLISHES SUBSTANTIVE HAZARDOUS WASTE PERMIT REQUIREMENTS NECESSARY FOR OHIO EPA TO DETERMINE ADEQUACY OF SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS, AND UNDERGROUND INJECTION WELLS USED TO TREAT, STORE OR DISPO	PERTAINS TO SITE AT WHICH HAZARDOUS WASTE WILL BE OR HAS BEEN STORED, TREATED OR DISPOSED OF IN SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS OR UNDERGROUND INJECTION WELLS . THIS, ALONG WITH OTHER PARAGRAPHS OF THI
HW	3745-50-44	C3	APP	ADD'L PERMIT INFO: HAZ WASTE STOR/TREAT IN SURF IMPOUND	ESTABLISHES SUBSTANTIVE HAZARDOUS WASTE PERMIT REQUIREMENTS NECESSARY FOR OHIO EPA TO DETERMINE ADEQUACY OF BOTH NEW SURFACE IMPOUNDMENTS AND EXTENSIONS OF EXISTING SURFACE IMPOUNDMENTS USED TO STORE OR TREAT HAZARDOUS WASTE. INCLUDES I	PERTAINS TO ANY SITE AT WHICH EITHER A NEW SURFACE IMPOUNDMENT WILL BE INSTALLED OR AN EXISTING SURFACE IMPOUNDMENT WILL BE EXPANDED. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS RULE AND OAC 3745-20-50 THROUGH 3745-33-60, ESTABLISHES THE
HW	3745-51-07	A,B	APP	RESIDUES OF HAZ WASTES IN EMPTY CONTAINERS	REGULATES THE RESIDUES OF HAZARDOUS WASTES FROM EMPTY CONTAINERS. PROVIDES SPECIFIC DEFINITIONS FOR EMPTY CONTAINERS.	PERTAINS TO ANY ALTERNATIVE THAT INCORPORATES STORAGE OF HAZARDOUS WASTE ON-SITE IN CONTAINERS.
HW	3745-51-11	A,B,C	APP	CRITERIA FOR LISTING HAZARDOUS WASTE	CRITERIA FOR DETERMINING STATUS OF WASTES	CONSIDER AT SITES WHERE WASTE IS GENERATED DURING REMEDIATION
HW	3745-52-11	A-D	APP	EVALUATION OF WASTES	ANY PERSON GENERATING A WASTE MUST DETERMINE IF THAT WASTE IS A HAZARDOUS WASTE (EITHER THROUGH LISTING OR BY CHARACTERISTIC).	PERTAINS TO SITES AT WHICH WASTES OF ANY TYPE (BOTH SOLID AND HAZARDOUS) ARE LOCATED.
HW	3745-52-20		APP	HAZARDOUS WASTE MANIFEST - GENERAL REQUIREMENTS	REQUIRES A GENERATOR WHO TRANSPORTS OR OFFERS FOR TRANSPORTATION HAZARDOUS WASTE FOR OFF-SITE TREATMENT, STORAGE OR DISPOSAL TO PREPARE A UNIFORM HAZARDOUS WASTE MANIFEST	PERTAINS TO SITES WHERE HAZARDOUS WASTE WILL BE TRANSPORTED OFF-SITE FOR TREATMENT, STORAGE OR DISPOSAL
HW	3745-52-22		APP	HAZARDOUS WASTE MANIFEST - NUMBER OF COPIES	SPECIFIES THE NUMBER OF MANIFEST COPIES TO BE PREPARED	PERTAINS TO SITES WHERE HAZARDOUS WASTE WILL BE TRANSPORTED OFF-SITE FOR TREATMENT, STORAGE OR DISPOSAL
HW	3745-52-23		APP	HAZARDOUS WASTE MANIFEST - USE	SPECIFIES PROCEDURES FOR THE USE OF HAZARDOUS WASTE MANIFESTS INCLUDING A REQUIREMENT THAT THEY BE HAND SIGNED BY THE GENERATOR	PERTAINS TO SITES WHERE HAZARDOUS WASTE WILL BE TRANSPORTED OFF-SITE FOR TREATMENT, STORAGE OR DISPOSAL

HW	3745-52-30		APP	HAZARDOUS WASTE PACKAGING	REQUIRES A GENERATOR TO PACKAGE HAZARDOUS WASTE IN ACCORDANCE WITH U.S. DOT REGULATIONS FOR TRANSPORTATION OFF-SITE.	PERTAINS TO ANY SITE WHERE HAZARDOUS WASTE WILL BE GENERATED BY ON-SITE ACTIVITIES AND SHIPPED OFF-SITE FOR TREATMENT AND/OR DISPOSAL.
HW	3745-52-31		APP	HAZARDOUS WASTE LABELING	REQUIRES PACKAGES OF HAZARDOUS WASTE TO BE LABELED IN ACCORDANCE WITH U.S.DOT REGULATIONS FOR OFF-SITE TRANSPORTATION.	PERTAINS TO ANY SITE WHERE HAZARDOUS WASTE WILL BE GENERATED BY ON-SITE ACTIVITIES AND SHIPPED OFF-SITE FOR TREATMENT AND/OR DISPOSAL.
HW	3745-52-32		APP	HAZARDOUS WASTE MARKING	SPECIFIES LANGUAGE FOR MARKING PACKAGES OF HAZARDOUS WASTE PRIOR TO OFF-SITE TRANSPORTATION	PERTAINS TO ANY SITE WHERE HAZARDOUS WASTE WILL BE GENERATED BY ON-SITE ACTIVITIES AND SHIPPED OFF-SITE FOR TREATMENT AND/OR DISPOSAL.
HW	3745-52-33		APP	HAZARDOUS WASTE PLACARDING	GENERATOR SHALL PLACARD HAZARDOUS WASTE PRIOR TO OFF-SITE TRANSPORTATION.	PERTAINS TO ANY SITE WHERE HAZARDOUS WASTE WILL BE GENERATED BY ON-SITE ACTIVITIES AND SHIPPED OFF-SITE FOR TREATMENT AND/OR DISPOSAL.
HW	3745-52-34		APP	ACCUMULATION TIME OF HAZARDOUS WASTE	IDENTIFIES MAXIMUM TIME PERIODS THAT A GENERATOR MAY ACCUMULATE A HAZARDOUS WASTE WITHOUT BEING CONSIDERED AN OPERATOR OF A STORAGE FACILITY. ALSO ESTABLISHES STANDARDS FOR MANAGEMENT OF HAZARDOUS WASTES BY GENERATORS.	PERTAINS TO A SITE WHERE HAZARDOUS WASTE WILL BE GENERATED AS A RESULT OF THE REMEDIAL ACTIVITIES.
HW	3745-52-40	A-D	APP	RECORDKEEPING REQUIREMENTS, THREE YEAR RETENTION	SPECIFIES RECORDS THAT SHALL BE KEPT FOR THREE YEARS	CONSIDER FOR SITES AT WHICH HAZARDOUS WASTES ARE GENERATED
HW	3745-52-41	A,B	APP	ANNUAL REPORT	REQUIRES GENERATORS TO PREPARE ANNUAL REPORT TO OPEA	APPLICABLE AT SITES GENERATING WASTES FOR OFF-SITE SHIPMENT
HW	3745-54-13	A	APP	GENERAL ANALYSIS OF HAZARDOUS WASTE	PRIOR TO ANY TREATMENT, STORAGE OR DISPOSAL OF HAZARDOUS WASTES, A REPRESENTATIVE SAMPLE OF THE WASTE MUST BE CHEMICALLY AND PHYSICALLY ANALYZED.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-14	A,B,C	APP	SECURITY FOR HAZARDOUS WASTE FACILITIES	HAZARDOUS WASTE FACILITIES MUST BE SECURED SO THAT UNAUTHORIZED AND UNKNOWING ENTRY ARE MINIMIZED OR PROHIBITED.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-15	A,C	APP	INSPECTION REQUIREMENTS FOR HAZARDOUS WASTE FACILITIES	HAZARDOUS WASTE FACILITIES MUST BE INSPECTED REGULARLY TO DETECT MALFUNCTIONS, DETERIORATIONS, OPERATIONAL ERRORS AND DISCHARGES. ANY MALFUNCTIONS OR DETERIORATIONS DETECTED SHALL BE REMEDIED EXPEDITIOUSLY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-17	A,B,C	APP	REQ FOR IGNITABLE, REACTIVE OR INCOMPATIBLE HAZ WASTES	PRESENTS GENERAL PRECAUTIONS TO BE TAKEN TO PREVENT ACCIDENTAL IGNITION OR REACTION OF IGNITABLE, REACTIVE OR INCOMPATIBLE WASTES.	PERTAINS TO ANY SITE AT WHICH POTENTIALLY REACTIVE, IGNITABLE OR INCOMPATIBLE WASTES ARE PRESENT.
HW	3745-54-18	A,B,C	APP	LOCATION STANDARDS FOR HAZARDOUS WASTE T/S/D FACILITIES	RESTRICTS THE SITING OF HAZARDOUS WASTE FACILITIES IN AREAS OF SEISMIC ACTIVITY OR FLOODPLAINS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).

HW	3745-54-31		APP	DESIGN & OPERATION OF HAZARDOUS WASTE FACILITIES	HAZARDOUS WASTE FACILITIES MUST BE DESIGNED, CONSTRUCTED, MAINTAINED AND OPERATED TO MINIMIZE THE POSSIBILITY OF FIRE, EXPLOSION OR UNPLANNED RELEASE OF HAZARDOUS WASTE OR HAZARDOUS CONSTITUENTS TO THE AIR, SOIL OR SURFACE WATER WHICH CO	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-32	A,B,C,D	APP	REQUIRED EQUIPMENT FOR HAZARDOUS WASTE FACILITIES	ALL HAZARDOUS WASTE FACILITIES MUST BE EQUIPPED WITH EMERGENCY EQUIPMENT, SUCH AS AN ALARM SYSTEM, FIRE CONTROL EQUIPMENT AND A TELEPHONE OR RADIO.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF). SPECIFICATIONS
HW	3745-54-33		APP	TESTING & MAINTENANCE OF EQUIPMENT; HAZ WASTE FACILITIES	ALL HAZARDOUS WASTE FACILITIES MUST TEST AND MAINTAIN EMERGENCY EQUIPMENT TO ASSURE PROPER OPERATION.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-34		APP	ACCESS TO COMMUNICATIONS OR ALARM SYSTEM; HAZ WASTE FAC	WHENEVER HAZARDOUS WASTE IS BEING HANDLED, ALL PERSONNEL INVOLVED SHALL HAVE IMMEDIATE ACCESS TO AN INTERNAL ALARM OR EMERGENCY COMMUNICATION DEVICE.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-35		APP	REQUIRED AISLE SPACE AT HAZ WASTE FACILITIES	ADEQUATE AISLE SPACE SHALL BE MAINTAINED TO ALLOW UNOBSTRUCTED MOVEMENT OF PERSONNEL, FIRE EQUIPMENT, SPILL CONTROL EQUIPMENT AND DECONTAMINATION EQUIPMENT INTO ANY AREA OF THE FACILITY OPERATION IN THE EVENT OF AN EMERGENCY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF). CONSIDER FOR SITES WHERE WASTES WILL BE STORED IN CONTAINERS.
HW	3745-54-37	A,B	APP	ARRANGEMENTS/ AGREEMENTS WITH LOCAL AUTHORITIES	ARRANGEMENTS OR AGREEMENTS WITH LOCAL AUTHORITIES, SUCH AS POLICE, FIRE DEPARTMENT AND EMERGENCY RESPONSE TEAMS MUST BE MADE. IF LOCAL AUTHORITIES WILL NOT COOPERATE, DOCUMENTATION OF THAT NON-COOPERATION SHOULD BE PROVIDED.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-52	A-F	APP	CONTENT OF CONTINGENCY PLAN; HAZ WASTE FACILITIES	HAZARDOUS WASTE FACILITIES MUST HAVE A CONTINGENCY PLAN THAT ADDRESSES ANY UNPLANNED RELEASE OF HAZARDOUS WASTES OR HAZARDOUS CONSTITUENTS INTO THE AIR, SOIL OR SURFACE WATER. THIS RULE ESTABLISHES THE MINIMUM REQUIRED INFORMATION OF SUCH A	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-53	A,B	APP	COPIES OF CONTINGENCY PLAN; HAZARDOUS WASTE FACILITIES	COPIES OF THE CONTINGENCY PLAN REQUIRED BY 3745-54-50 MUST BE MAINTAINED AT THE FACILITY AND SUBMITTED TO ALL LOCAL POLICE DEPARTMENTS, FIRE DEPARTMENTS, HOSPITALS LOCAL EMERGENCY RESPONSE TEAMS AND THE OHIO EPA.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF)
HW	3745-54-54	A	APP	AMENDMENT OF CONTINGENCY PLAN; HAZ WASTE FACILITIES	THE CONTINGENCY PLAN MUST BE AMENDED IF IT FAILS IN AN EMERGENCY, THE FACILITY CHANGES (IN ITS DESIGN, CONSTRUCTION, MAINTENANCE OR OPERATION), THE LIST OF EMERGENCY COORDINATORS CHANGE OR THE LIST OF EMERGENCY EQUIPMENT.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-55		APP	EMERGENCY COORDINATOR; HAZARDOUS WASTE FACILITIES	AT ALL TIMES THERE SHOULD BE AT LEAST ONE EMPLOYEE EITHER ON THE PREMISES OR ON CALL TO COORDINATE ALL EMERGENCY RESPONSE MEASURES.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).

HW	3745-54-56	A-I	APP	EMERGENCY PROCEDURES; HAZARDOUS WASTE FACILITIES	SPECIFIES THE PROCEDURES TO BE FOLLOWED IN THE EVENT OF AN EMERGENCY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).
HW	3745-54-73	A,B	APP	OPERATING RECORD	SPECIFIES RECORDS TO BE KEPT AT TSD FACILITIES	CONSIDER FOR SITES WITH ON-SITE TREATMENT, STORAGE OR DISPOSAL
HW	3745-54-74	A,B,C	APP	AVAILABILITY, RETENTION, AND DISPOSITION OF RECORDS.	DISCUSSES RECORD KEEPING RULES AT FACILITIES	CONSIDER AT SITES WITH TREATMENT, STORAGE OR DISPOSAL
HW	3745-54-77	A	APP	ADDITIONAL REPORTS	REQUIRES FACILITIES TO REPORT FIRES, EXPLOSIONS OR OTHER MISHAPS	CONSIDER AT SITES WITH TREATMENT, STORAGE OR DISPOSAL ON-SITE
HW	3745-54-90		APP	GROUND WATER PROTECTION; APPLICABILITY	ESTABLISHES CIRCUMSTANCES UNDER WHICH AN OPERATOR OF A HAZARDOUS WASTE FACILITY MUST IMPLEMENT A GROUND WATER PROTECTION PROGRAM OR A CORRECTIVE ACTION PROGRAM.	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS) THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION.
HW	3745-54-91	A	APP	REQ GROUND WATER PROGRAMS FOR HAZ WASTE FACILITIES	PRESENTS THE GROUND WATER MONITORING AND RESPONSE PROGRAMS REQUIRED FOR HAZARDOUS WASTE LAND-BASED UNITS.	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS). THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION.
HW	3745-54-92		APP	GROUND WATER PROTECTION STANDARD; HAZ WASTE FACILITIES	COMPLIANCE MUST BE ATTAINED WITH THE CONDITIONS SPECIFIED IN THE PERMIT TO ENSURE THAT HAZARDOUS CONSTITUENTS (SEE 3745-54-93) DO NOT EXCEED THE PROMULGATED LIMITS (SEE 3745-54-94).	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS). THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION.
HW	3745-54-93	A,B	APP	HAZARDOUS CONSTITUENTS IN GROUND WATER; HAZ WASTE FAC	REQUIRES THAT PERMIT SPECIFY HAZARDOUS CONSTITUENTS TO WHICH THE GROUND WATER PROTECTION STANDARD OF 3745-54-92 APPLIES. HAZARDOUS CONSTITUENTS ARE CONSTITUENTS IDENTIFIED IN THE APPENDIX OF THIS RULE THAT HAVE BEEN DETECTED IN GROUND W	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS). THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION.
HW	3745-54-94	A,B	APP	CONCENTRATION LIMITS FOR GROUND WATER; HAZ WASTE FAC	PRESENTS THE METHODOLOGY FOR DETERMINING CONCENTRATION LIMITS AND ALTERNATIVE CONCENTRATION LIMITS.	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS). THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION.
HW	3745-54-95	A,B	APP	POINT OF COMPLIANCE FOR GROUND WATER; HAZ WASTE FACIL	ESTABLISHES POINT OF COMPLIANCE AT VERTICAL SURFACE LOCATED AT THE HYDRAULICALLY DOWNGRADIENT LIMIT OF THE WASTE MANAGEMENT AREA THAT EXTENDS DOWN INTO THE UPPERMOST AQUIFER UNDERLYING THE UNIT(S).	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS). THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION.
HW	3745-54-96	A,B,C	APP	COMPLIANCE PERIOD FOR GROUND WATER HAZ WASTE FACIL	COMPLIANCE PERIOD DURING WHICH THE GROUND WATER PROTECTION STANDARDS APPLY WILL BE SPECIFIED IN THE PERMIT. RULE REQUIRES THAT THE COMPLIANCE PERIOD FOR A FACILITY UNDERGOING A CORRECTIVE ACTION PROGRAM WILL EXTEND UNTIL IT CAN BE DEMONS	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS). THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION.

HW	3745-54-97	A-H	APP	GEN GROUND WATER MONITORING REQUIREMENTS; HAZ WASTE FAC	PRESENTS GENERAL GROUND WATER MONITORING PROGRAM REQUIREMENTS. INCLUDES NUMBER, LOCATION AND DEPTH OF WELLS, CASING REQUIREMENTS, SAMPLING AND ANALYSIS PROCEDURES, ETC.	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS). THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION.
HW	3745-54-98	A-I	TBC	GROUND WATER DETECTION MONITORING PROG; HAZ WASTE FAC	PRESENTS REQUIREMENTS OF GROUND WATER DETECTION PROGRAM.	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS) AT WHICH HAZARDOUS CONSTITUENTS HAVE NOT BEEN DETECTED IN THE GROUND WATER. THIS INCLUDES EXISTING LAND-BASE
HW	3745-54-99	A-J	TBC	GROUND WATER COMPLIANCE MONITORING PROG; HAZ WASTE FAC	PRESENTS REQUIREMENTS OF GROUND WATER COMPLIANCE MONITORING PROGRAM.	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS) AT WHICH HAZARDOUS CONSTITUENTS HAVE BEEN DETECTED. THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION
HW	3745-55-01	A-F	APP	GROUND WATER CORRECTIVE ACTION PROGRAM; HAZ WASTE FAC	PRESENTS THE REQUIREMENTS OF A GROUND WATER CORRECTIVE ACTION PROGRAM THAT PREVENTS HAZARDOUS CONSTITUENTS FROM EXCEEDING THEIR RESPECTIVE CONCENTRATION LIMITS AT THE COMPLIANCE POINT BY EITHER REMOVAL OR TREATMENT OF THESE HAZARDOUS CONSTI	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS) AT WHICH HAZARDOUS CONSTITUENTS HAVE BEEN DETECTED. THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION
HW	3745-55-011	A,C	APP	CORRECTIVE ACTION FOR WASTE MANAGEMENT UNITS	REQUIRES AN APPLICANT FOR A HAZARDOUS WASTE PERMIT TO INSTITUTE CORRECTIVE ACTION FOR ALL RELEASES OF HAZARDOUS WASTE OR CONSTITUENTS FROM ANY WASTE MANAGEMENT UNIT, REGARDLESS OF THE TIME AT WHICH WASTE WAS PLACED IN SUCH UNIT.	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDFILLS) AT WHICH HAZARDOUS CONSTITUENTS HAVE BEEN DETECTED. THIS INCLUDES EXISTING LAND-BASED AREAS OF CONTAMINATION
HW	3745-55-11	A,B,C	APP	GENERAL CLOSURE PERFORMANCE STANDARD; HAZ WASTE FACIL	REQUIRES THAT ALL HAZARDOUS WASTE FACILITIES BE CLOSED IN A MANNER THAT MINIMIZES THE NEED FOR FURTHER MAINTENANCE, CONTROLS, MINIMIZES, ELIMINATES OR PREVENTS POST-CLOSURE ESCAPE OF HAZARDOUS WASTE, HAZARDOUS CONSTITUENTS, LEACHATE, CON	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN TREATED, STORED OR DISPOSED OF).
HW	3745-55-12	B	TBC	CONTENT OF CLOSURE PLAN; HAZ WASTE FACILITIES	SPECIFIES THE MINIMUM INFORMATION REQUIRED IN A CLOSURE PLAN FOR OHIO EPA TO DETERMINE THE ADEQUACY OF THE PLAN.	SUBSTANTIVE REQUIREMENTS PERTAIN TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN TREATED, STORED OR DISPOSED OF).
HW	3745-55-14		APP	DISPOSAL/ DECON OF EQUIPMENT, STRUCTURES & SOILS	REQUIRES THAT ALL CONTAMINATED EQUIPMENT, STRUCTURES AND SOILS BE PROPERLY DISPOSED OF OR DECONTAMINATED. REMOVAL OF HAZARDOUS WASTES OR CONSTITUENTS FROM A UNIT MAY CONSTITUTE GENERATION OF HAZARDOUS WASTES.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OR HAS BEEN TREATED, STORED OR DISPOSED OF).
HW	3745-55-17	B	APP	POST-CLOSURE CARE AND USE OF PROPERTY	SPECIFIES THE POST-CLOSURE CARE REQUIREMENTS, INCLUDING MAINTENANCE, MONITORING AND POST-CLOSURE USE OF PROPERTY.	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (LANDFILLS AND SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS AND TANKS THAT MEET REQUIREMENTS OF LANDFILLS AFTER CLOSURE). THIS INCLUDES EXISTING LAND-BASED AREAS OF C

HW	3745-55-18	B	TBC	POST-CLOSURE PLAN	PRESENTS THE INFORMATION NECESSARY FOR OHIO EPA TO DETERMINE THE ADEQUACY OF A POST-CLOSURE PLAN.	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (LANDFILLS AND SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS AND TANKS THAT MEET REQUIREMENTS OF LANDFILLS AFTER CLOSURE). THIS INCLUDES EXISTING LAND-BASED AREAS OF C
HW	3745-55-19	B	APP	NOTICE TO LOCAL LAND AUTHORITY	REQUIRES THAT A RECORD OF THE TYPE, LOCATION AND QUANTITY OF HAZARDOUS WASTES DISPOSED OF IN EACH UNIT BE SUBMITTED TO THE LOCAL LAND AUTHORITY AND THE DIRECTOR OF THE OHIO EPA. ALSO REQUIRES THAT A NOTATION TO THE DEED TO THE FACILITY P	PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE UNITS (LANDFILLS AND SURFACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS AND TANKS THAT MEET REQUIREMENTS OF LANDFILLS AFTER CLOSURE). THIS INCLUDES EXISTING LAND-BASED AREAS OF C
HW	3745-55-71		APP	CONDITION OF CONTAINERS	CONTAINERS HOLDING HAZARDOUS WASTE MUST BE MAINTAINED IN GOOD CONDITION (NO RUST OR STRUCTURAL DEFECTS).	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW	3745-55-72		APP	COMPATIBILITY OF WASTE WITH CONTAINERS	HAZARDOUS WASTES PLACED IN CONTAINER MUST NOT REACT WITH THE CONTAINER MATERIAL OR LINER MATERIAL.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW	3745-55-73		APP	MANAGEMENT OF CONTAINERS	CONTAINERS HOLDING HAZARDOUS WASTE MUST BE CLOSED (EXCEPT TO ADD OR REMOVE WASTE) AND MUST NOT BE HANDLED IN A MANNER THAT MAY RUPTURE THE CONTAINER OR CAUSE IT TO LEAK.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW	3745-55-74		APP	CONTAINER INSPECTIONS	REQUIRES AT LEAST WEEKLY INSPECTIONS OF CONTAINER STORAGE AREAS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW	3745-55-75	A,B,C,D	APP	CONTAINER STORAGE AREA CONTAINMENT SYSTEM	REQUIRES THAT CONTAINER STORAGE AREAS HAVE A CONTAINMENT SYSTEM AND SPECIFIES THE MINIMUM REQUIREMENTS OF SUCH A SYSTEM.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW	3745-55-76		APP	CONTAINER REQUIREMENTS FOR IGNITABLE/REACTIVE WASTES	PRESENTS GENERAL PRECAUTIONS TO BE TAKEN TO PREVENT ACCIDENTAL IGNITION OR REACTION OF IGNITABLE OR REACTIVE WASTES THAT WILL BE STORED IN CONTAINERS.	PERTAINS TO ANY SITE AT WHICH POTENTIALLY REACTIVE OR IGNITABLE WASTES THAT ARE STORED, OR ARE TO BE STORED, IN CONTAINERS.
HW	3745-55-77	A,B,C	APP	CONTAINER REQUIREMENTS FOR INCOMPATIBLE WASTES	PRESENTS GENERAL PRECAUTIONS TO BE TAKEN WHEN DEALING WITH INCOMPATIBLE WASTES.	PERTAINS TO ANY SITE AT WHICH POTENTIALLY INCOMPATIBLE WASTES ARE PRESENT.
HW	3745-55-78		APP	CONTAINER CLOSURE REQUIREMENTS	SPECIFIES CLOSURE REQUIREMENTS FOR CONTAINERS AND CONTAINMENT SYSTEM.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STORED IN CONTAINERS.
HW	3745-55-91	A,B,D	REL	ASSESSMENT OF EXISTING TANK SYSTEMS INTEGRITY	REQUIRES THAT EACH EXISTING TANK USED TO STORE OR TREAT HAZARDOUS WASTE THAT DOES NOT HAVE SECONDARY CONTAINMENT BE TESTED TO ASSURE TANK INTEGRITY.	PERTAINS TO ANY SITE WHICH HAS EXISTING HAZARDOUS WASTE TREATMENT OR STORAGE TANKS THAT LACK SECONDARY CONTAINMENT.
HW	3745-55-92	A-G	REL	DESIGN & INSTALLATION OF NEW TANK SYSTEMS OR COMPONENTS	REQUIRES A SECONDARY CONTAINMENT SYSTEM FOR TANKS AND ASSESSMENT TO DETERMINE TANK INTEGRITY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.
HW	3745-55-93	A-G,I	REL	CONTAINMENT AND DETECTION OF RELEASES FOR TANK SYSTEMS	REQUIRES SECONDARY CONTAINMENT AND LEAK DETECTION SYSTEMS FOR TANKS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.

HW	3745-55-94	A,B,C	REL	GENERAL OPERATING REQUIREMENTS FOR TANK SYSTEMS	SPECIFIES GENERAL OPERATING REQUIREMENTS FOR TANK SYSTEMS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.
HW	3745-55-95	A-D	REL	INSPECTIONS OF TANK SYSTEMS	REQUIRES INSPECTIONS AT LEAST ONCE EACH OPERATING DAY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.
HW	3745-55-96	A,B,C,E	REL	RESPONSE TO LEAKS OR SPILLS OF TANK SYSTEMS	REQUIRES THAT UNFIT TANKS BE REMOVED FROM USE AND FURTHER RELEASES BE PREVENTED.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.
HW	3745-55-97	A,B	REL	CLOSURE AND POST-CLOSURE CARE FOR TANK SYSTEMS	SPECIFIES CLOSURE AND POST-CLOSURE REQUIREMENTS FOR TANK SYSTEMS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS. SPECIFIES THE MINIMUM INFORMATION
HW	3745-55-98		REL	TANK REQUIREMENTS FOR IGNITABLE/REACTIVE WASTES	PRESENTS GENERAL PRECAUTIONS TO BE TAKEN TO PREVENT ACCIDENTAL IGNITION OR REACTION OF IGNITABLE OR REACTIVE WASTES THAT ARE TREATED OR STORED IN TANKS.	PERTAINS TO ANY SITE AT WHICH POTENTIALLY REACTIVE OR IGNITABLE WASTES ARE STORED OR TREATED (OR TO BE STORED OR TREATED) IN EXISTING TANKS.
HW	3745-55-99	A,B	REL	TANK REQUIREMENTS FOR INCOMPATIBLE WASTES	PRESENTS GENERAL PRECAUTIONS TO BE TAKEN WHEN DEALING WITH POTENTIALLY INCOMPATIBLE WASTES THAT ARE STORED OR TREATED IN TANKS.	PERTAINS TO ANY SITE AT WHICH POTENTIALLY INCOMPATIBLE WASTES ARE STORED OR TREATED (OR TO BE STORED OR TREATED) IN TANKS.
HW	3745-56-20	A,B	APP	APPLICABILITY OF RULES CONCERNING SURFACE IMPOUNDMENT	SPECIFIES THAT THE RULES OF 3745-56 SHALL APPLY TO SURFACE IMPOUNDMENTS USED TO TREAT OR STORE HAZARDOUS WASTES	CONSIDER FOR SITES WITH SURFACE IMPOUNDMENTS
HW	3745-56-28	A,B,C	APP	CLOSURE & POST-CLOSURE OF SURFACE IMPOUNDMENTS	PROVIDES CLOSURE AND POST-CLOSURE REQUIREMENTS FOR SURFACE IMPOUNDMENTS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE TREATED OR STORED IN SURFACE IMPOUNDMENTS (LAGOONS). PERTAINS TO SITES WHICH HAVE SURFACE IMPOUNDMENTS THAT WILL NOT BE (OR HAVE NOT BEEN) CLEAN CLOSED.
HW	3745-56-51	A-F	APP	DESIGN & OPERATING REQUIREMENTS FOR WASTE PILES	SPECIFIES THE DESIGN AND OPERATION REQUIREMENTS FOR WASTE PILES. INCLUDES LINER SYSTEM, LEACHATE COLLECTION AND REMOVAL SYSTEM, WIND DISPERSAL PREVENTION AND RUN-ON/RUN-OFF CONTROL.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN WASTE PILES.
HW	3745-56-54	A,B	APP	MONITORING & INSPECTION OF WASTE PILES	WASTE PILES MUST BE MONITORED DURING CONSTRUCTION OR INSTALLATION AND OPERATION.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN WASTE PILES.
HW	3745-56-58	A,B,C	APP	CLOSURE & POST-CLOSURE CARE FOR WASTE PILES	SPECIFIES CLOSURE AND POST-CLOSURE CARE REQUIREMENTS FOR WASTE PILES.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN WASTE PILES.
HW	3745-56-59	A	APP	CONSTRUCTION INSPECTIONS FOR WASTE PILES	ALLOWS OHIO EPA THE OPPORTUNITY TO INSPECT WASTE PILES DURING CONSTRUCTION.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN WASTE PILES.
HW	3745-56-60	A,B	APP	SPECIAL REQUIREMENTS FOR "F" WASTES IN WASTE PILES	PROHIBITS THE PLACEMENT OF HAZARDOUS WASTES F020, F021, F022, F023, F026 AND F027 IN WASTE PILES.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS F-WASTES WILL BE EITHER STORED OR TREATED IN WASTE PILES.
HW	3745-57-72	A-H	APP	CORRECTIVE ACTION MANAGEMENT UNITS.	DISCUSSES RULES FOR CORRECTIVE ACTION MANAGEMENT UNITS	CONSIDER FOR SITES WITH ON-SITE TREATMENT, STORAGE OR DISPOSAL

DW	3745-81-11	A,B,C	REL	MAXIMUM CONTAMINANT LEVELS FOR INORGANIC CHEMICALS	PRESENTS MAXIMUM CONTAMINANT LEVELS FOR INORGANICS.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.
DW	3745-81-12	A,B,C	REL	MAXIMUM CONTAMINANT LEVELS FOR ORGANIC CHEMICALS	PRESENTS MCLS FOR ORGANICS.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.
DW	3745-81-15	A,B	REL	MAX CONTAMINANT LEVELS FOR RADIUM 226,228,GROSS ALPHAS	PRESENTS MCLS FOR RADIUM-226, RADIUM-228 AND GROSS ALPHA PARTICLE ACTIVITY.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.
DW	3745-81-16	A,B	REL	MAX CONTAM LEVELS FOR BETA PARTICLE & PHOTON RADIOACTIV	PRESENTS MCLS FOR BETA PARTICLE AND PHOTON RADIOACTIVITY FROM MAN-MADE RADIONUCLIDES.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.
DW	3745-81-25	A-D	TBC	ANALYTICAL METHODS FOR RADIOACTIVITY	PRESENTS ANALYTICAL METHODS FOR RADIOACTIVITY.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.
DW	3745-81-27	A-E	TBC	ANALYTICAL TECHNIQUES	PRESENTS GENERAL ANALYTICAL TECHNIQUES FOR MCLS.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.
GW	3745-9-04	A,B	REL	LOCATION/SITING OF NEW GW WELLS	MANDATES THAT GROUND WATER WELLS BE:A) LOCATED AND MAINTAINED SO AS TO PREVENT CONTAMINANTS FROM ENTERING WELL.B) LOCATED SO AS TO BE ACCESSIBLE FOR CLEANING AND MAINTENANCE.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.
GW	3745-9-05	A1,B-H	REL	CONSTRUCTION OF NEW GW WELLS	SPECIFIES MINIMUM CONSTRUCTION REQUIREMENTS FOR NEW GROUND WATER WELLS IN REGARDS TO CASING MATERIAL, CASING DEPTH, POTABLE WATER, ANNULAR SPACES, USE OF DRIVE SHOE, OPENINGS TO ALLOW WATER ENTRY, CONTAMINANT ENTRY.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.
GW	3745-9-06	A,B,D,E	APP	CASING REQUIREMENTS FOR NEW GW WELLS	ESTABLISHES SPECIFIC REQUIREMENTS FOR WELL CASINGS, SUCH AS SUITABLE MATERIAL, DIAMETERS AND CONDITION.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.
GW	3745-9-07	A-F	REL	SURFACE DESIGN OF NEW GW WELLS	ESTABLISHES SPECIFIC SURFACE DESIGN REQUIREMENTS, SUCH AS HEIGHT ABOVE GROUND, WELL VENTS, WELL PUMPS, ETC.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.
DW	3745-9-09	A-C,D1,E-G	REL	MAINTENANCE & OPERATION OF GW WELLS	ESTABLISHES SPECIFIC MAINTENANCE AND MODIFICATION REQUIREMENTS FOR CASING, PUMP AND WELLS IN GENERAL.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. WOULD PERTAIN DURING THE FS IF NEW WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.

GW	3745-9-10	A,B,C	REL	ABANDONMENT OF TEST HOLES & GW WELLS	FOLLOWING COMPLETION OF USE, WELLS AND TEST HOLES SHALL BE COMPLETELY FILLED WITH GROUT OR SIMILAR MATERIAL OR SHALL BE MAINTAINED IN COMPLIANCE OF ALL REGULATIONS.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER W LL BE INSTALLED OR HAVE BEEN INSTALLED SINCE FEB. 15, 1975. GIVES EXCEPTIONS FROM MONITORING, SOIL LINER, CAPPING, GEOMEMBRA
GW	3745-9-11		REL	USE OF WELLS FOR DISPOSAL	NO PERSON SHALL USE ANY WELL TO INJECT OR REINJECT ANY SUBSTANCE INTO THE GROUND WITHOUT NECESSARY PERMITS.	MAY PERTAIN TO SYSTEMS THAT ENTAIL INJECTION OR REINJECTION OF FLUID INTO THE GROUND. CONSIDER FOR IN-SITU BIOREMEDIATION, SOIL FLUSHING AND GROUND WATER PLUME CONTAINMENT.

APPENDIX III
EXPLANATION OF COSTS

Department of Energy
Portsmouth Site Office
P.O. Box 700
Piketon, Ohio 45661-0700
Phone: 740-897-5010
Fax: 740-897-2982

May 5, 2003
EM-97-0723

Ms. Maria Galanti
Ohio Environmental Protection Agency
Southeast District Office
2195 Front Street
Logan, Ohio 43138

Dear Ms. Galanti:

QUADRANT II CLEANUP ALTERNATIVE STUDY/CORRECTIVE MEASURES STUDY (CAS/CMS) ESTIMATES

The purpose of this letter is to provide clarification on estimates presented to Ohio EPA during recent meetings and to provide the rationale for not revising the CAS/CMS estimates to reflect the latest technical approach.

During the course of the Core and Technical Team meetings (comprised of USDOE, USEPA, and OEPA) for Quadrant II, several issues were raised regarding differences between the Quadrant II CAS/CMS estimates and the latest budget estimates for the Quadrant II Preferred Plan. Estimates were developed during the preparation of the Quadrant II CMS/CAS to clarify cost differences between each of the developed alternatives. Since these estimates were intended for comparison purposes, some portions of the project scope which were common to all CMS alternatives were not included. In addition, all CMS Groundwater Alternatives were assumed to have no ongoing source of Dense Non-aqueous Phase Liquid (DNAPL) within the units being recommended for remediation. These estimates were appropriate for their intended use, facilitated decision making for the quadrant, and were an integral part of the Quadrant II CMS/CAS that was subsequently approved by USEPA and OEPA.

During the finalization of the Preferred Plan for Quadrant II, it became apparent that DNAPL was a significant factor affecting cleanup of the X-701B Groundwater Plume. As a result, refinements were made to several of the alternatives developed during the CAS/CMS by a Core Team comprised of USDOE, USEPA, and OEPA. Based on the results of these refinements, USDOE has initiated formalized multi-year budget planning for the proposed remediation of X-701B. The budget estimates were prepared in accordance with USDOE guidance and address all factors that affect the overall cost of the proposed remedy. Included in these factors are subcontractor overhead, site overhead, sales tax, and escalation.

Any comparison between the CMS estimates and the latest DOE budget estimates for the proposed remedy will show a significant difference in cost, since there are major differences between their intended purpose and basis in scope. Although all of the CAS/CMS estimates could be revised to a point where they are comparable to the latest DOE budget estimate, this is not recommended for the following reasons:

1) A revision to the CMS estimates would not lead to any significant change in the selected remedy.
2) Any changes to the CMS estimates would be expensive, and consume limited USDOE budget dollars that are best used for remediation.
3) Any revisions to CMS estimates would take time, could conceivably delay the completion of the Quadrant II Decision Document an additional fiscal year, and will unnecessarily delay the remediation of the units.

This information is being provided for clarification purposes for the Quadrant II remedies. If you have any questions, please contact Kristi Wiehle of my staff at (740) 897-5020.

Sincerely,

Russell J. Vranicar
Acting Site Manager
Portsmouth Site Office

cc:
W. Murphie, EM-1/Cloverleaf
L.D. Boggs, EM-90/ORO
Administrative Records
Gil Drexel, BJC/PORTS
T. Slack, CC-10/ORO

APPENDIX IV
RESPONSIVENESS SUMMARY

SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD

This responsiveness summary responds to significant comments submitted on the preferred plan for the X-701B SWMU in Quadrant II of the Portsmouth Gaseous Diffusion Plant and is intended to be consistent with Sections 113(k) (2) (B) (iv) and 117(B) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). This section requires that Agency respond "... to each of the significant comments, criticisms, and new data submitted in written or oral presentations" on the preferred plan. One comment was submitted to Ohio EPA during the public comment period regarding a potential technology to be considered regarding groundwater remedial activities.

The administrative record index for the U.S. Department of Energy (U.S. DOE) site which includes the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), the Cleanup Alternatives Study/Corrective Measures Study (CAS/CMS) and the Preferred Plan is available to the public at the US DOE Environmental Information Center located in Pikcton, Ohio or in the Ohio EPA South East District Office located in Logan, Ohio. The public notice alerting the public of their opportunity to comment on the preferred plan was placed in the ***Pike County News Watchman*** on September 17th and September 21, 2003. The public comment period closed on October 28, 2003. A public meeting to discuss the preferred plans was held on October 7, 2003, at the Ohio University South Center 1864 Shyville Road, Piketon, Ohio.

1.2 Summary of Comments

The public comments regarding the U.S. DOE site are organized into the following categories:

(1) Summary of comments and Agency responses to citizens regarding the preferred plan.

2.0 COMMENTS FROM THE COMMUNITY

1) The comment pertains to the use of various oxidizing chemicals to remediate the groundwater contamination in the X-701B SWMU area. Please refer to the comment below:

COMMENTS on the Proposed Remedial Action for Treatment of Trichloethylene (TCE) Contaminated Plumes using Potassium Permanganate (KMnO4) solution.

Potassium Permanganate or KMnO4 has been widely used for treatment of Organic Contaminants and Pathogens in drinking water and wastewater streams for many years. KMnO4 is a moderately strong oxidizing agent and has a lower relative oxidation power when compared against Hydrogen Peroxide and Ozone. Oxidation of TCE, using KMnO4 is expected to yield daughter products such as Dichloroethylene (DCE) and Vinyl Chloride (VC). Both the DCE and the VC are hazardous contaminants and can stay in the groundwater for a very long period of time.

VEETech, P.C. had deployed a modified version of the Fenton's Oxidation technology for remediation of plumes containing TCE contaminant. The modified Fenton's Oxidation chemistry entailed an in-situ reaction between Hydrogen Peroxide and Iron to yield Hydroxyl Free Radical (OH*). The OH*, a very powerful oxidant, then reacts with TCE to yield HC1, CO2 and H2O. The results for field deployment indicated that even with this very powerful chemistry, a fair amount of DCE and VC were produced and remained in the groundwater plume.

Based on practical experience, VEETech learned the ways and means for complete conversion of TCE contaminant. Present of an oxygenated compound, such as Deuterium Sulfate (D2SO4), during oxidation can prevent the formation of DCE and VC contaminant. The D2SO4 splits the water molecules and produces atomic oxygen which enables complete oxidation for the TCE contaminant, thus minimizing or eliminating the formation of undesirable by-products.

It is also prudent to deploy Bioremediation Techniques, following completion of oxidation treatment. Bioremediation using augmentation of native microbes can bring the contaminated plume to a complete closure without the re-appearance of daughter products. Presence of D2SO4

in the plume can help maintaining several fold high concentration for dissolved oxygen (DO), which causes an explosion in the growth of beneficial microbes. These microbes metabolize the residual contaminants and cleanse the plume.

Based on past experience, VEETech recommends testing and incorporation of D2SO4 to bolster the effectiveness of the re-circulating KMnO4 oxidation treatment technology. It is further recommended that following Chemical Oxidation, Bioremediation using augmentation of native microbes be deployed to achieve complete closure for the contaminated plume.

Out of many remediation technology for the treatment of TCE contaminated Ponds, one of the innovative technology will be to treat the contaminated pond water with sonically vibrated-chemical oxidation technology (SVCOT). It has been envisioned that treatment of vast contaminated land and large amount of soil and water poses a tremendous challenge to apply simple laboratory techniques for treatment. In reality, an economical and viable technology is needed to overcome the problem. By using chemical oxidation alone does not guarantee a mixing process or dispersion of oxidant in the water plume or the non-aqueous phase. Due to the lack of mixing or proper agitation in the chemical oxidation treatment, the process will take an enormous time period for remediation. A stagnant chemical oxidation process cannot be realistic remediation technology for TCE remediation in contaminated ponds. Pegasus Technical Services (PTS) proposes a remediation technology for the treatment of contaminated ponds. This technology is based upon the concept of providing continuous agitation of the plume with oxidant using low frequency vibration technology. Low frequency vibration is provided through the generation of sound waves in a flow through a pipe. With proper selection of flow rate of fluid and monitoring the oxidant concentration, it is possible to achieve an enhanced remediation of TCE from the contaminated ponds.

Ohio EPA Response:

The preferred plan and the decision document do not discuss the use of a specific oxidant to remediate the contaminated groundwater. The type and the amount of oxidant to be used will be discussed during the design phase of remedy implementation. Currently, US DOE is conducting studies of soils and groundwater from the X-701B SWMU area to determine the amount of and type of oxidant that will result in the removal of contaminants in order to achieve the remedial goals outlined in this decision document. Potential use of the oxidant and processes described by

the commentor would not require a revision modification of the Decision Document. (i.e. it would be consistent with the selected alternative.)

Ohio EPA suggests that the commentor contact US DOE to discuss the technology discussed above and determine if it may be applicable to the X-701B SWMU area based on the current data U.S. DOE is collecting on the soil and groundwater.